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INTRODUCTION.

This REVIEW is based on reports for October, 1890, from 2,319 regular and voluntary observers. These reports are classified as follows: 166 reports from Signal Service stations; 118 reports from United States Army post surgeons; 1,512 monthly reports from state weather service and voluntary observers; 32 reports from Canadian stations; 166 reports through the Central Pacific Railway Company; 325 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Ser-

vice;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Iowa, Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, and Wisconsin, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR OCTOBER, 1890.

The month was warmer than the average October over the northern part of the country east of the valley of the Columbia River, along the Pacific coast south of the 40th parallel, over the southwest part of the plateau region, on the southeast slope of the Rocky Mountains, in the lower Rio Grande valley, and in southern Florida; elsewhere the month was cooler than usual. The greatest departure above the average temperature for October occurred in Manitoba and on the south Pacific coast, where it exceeded 4°, and the most marked departure below the average was noted over the interior of Alabama and Georgia, and in east Tennessee, where it equalled or exceeded 3°. At Los Angeles, Cal., the mean temperature was 1° 5 higher than previously reported for October. The highest temperature reported by a regular station of the Signal Service was 99° at Los Angeles, Cal., and by a voluntary observer, 118°, at Merced, Cal. At Galveston, Tex., the maximum temperature was 2° higher than previously reported for October. The lowest temperature reported by a regular station of the Signal Service was 14° at Huron, S. Dak., and by a voluntary observer, -10°, at Breckenridge, Colo. At Key West, Fla., the minimum temperature was 1° lower than previously reported for October. Killing frost occurred on the middle Atlantic coast from New Jersey northward, in the interior of the Gulf States, in central New Mexico and southeast Arizona, in eastern California, and along the Oregon and Washington coasts.

The heaviest precipitation ever reported for October occurred at stations in eastern Massachusetts, central and northeastern Pennsylvania, western Maryland, extreme western Florida, south-central Louisiana, east-central lower Michigan, northwestern North Dakota, north-central Montana, and southwestern Arizona. The least precipitation ever reported for October occurred in north-central Kansas, west-central Texas, east-central Washington, and at San Francisco, Cal. The greatest excess above the average precipitation for October was reported on the southeast New England coast, where it exceeded 6.00 inches; in extreme northwestern Washington and the adjoining part of British Columbia the excess varied from 4.00 to nearly 6.00 inches; in east-central Texas it exceeded 5.00 inches; in extreme western Florida 4.00 inches; and in north-

east Iowa, at Rio Grande City, Tex., and on Prince Edward Island, Gulf of Saint Lawrence, 3.00 inches. The most marked deficiency in monthly precipitation occurred at Key West, Fla., where it was nearly 4.00 inches, and the deficiency was more than 2.00 at Eastport, Me., Quebec, on the North Carolina coast, at Springfield, Ill., and Escanaba, Mich. In the east Gulf states, New England, and the lower lake region the precipitation was two-thirds to three-fourths greater, and in the middle Atlantic states it was about one-half greater than the average. At Key West, Fla., about one-third, at Spokane Falls, Wash., about one-half, and on the middle-eastern slope of the Rocky Mountains, and in the Missouri valley, two-thirds to three-fourths of the usual amount of precipitation was reported. Reports from California indicate some damage to raisin grapes by the rain of the last few days of September. Monthly snowfall exceeding 20.0 inches was reported at elevated stations in central Colorado, and at Virginia City, Mont.; 2.0 to 7.0 inches fell along the line of the Central Pacific Railroad crossing the Sierra Nevada Mountains; 6.0 to 8.0 inches in northeastern lower Idaho; 2.0 to 5.0 inches in central and western Nevada; 5.0 inches in southwestern Nebraska; 8.0 inches in extreme northwestern Minnesota; more than 10.0 inches in north-central upper Michigan; 11.0 inches in extreme western New York; 8.0 to 11.0 inches in south-central Pennsylvania; and 8.0 inches in northeast West Virginia.

On the 16th a tornado moved northeastward from near Hasty, N. C., to northwest of Maxton, and thence passed to a point a few miles northeast of Floral College, N. C., where it disappeared. During the passage of this storm one person was killed and several were injured. The damage to houses was about \$1,000, and to crops about \$1,000. Destructive general storms occurred on the Gulf of Saint Lawrence on the 5th and 6th; on the upper lakes from the 12th to 14th; along the middle Atlantic and New England coasts and on the lower lakes on the 17th; on Lake Michigan on the 18th; in southeast New York and along the south New England coast on the 19th; over Chesapeake Bay and along the middle Atlantic coast on the 23d; on the middle Atlantic and New England coasts, 24th; and on the south New England coast, 24th and 25th.

Widely observed auroral displays were observed on the 17th,

when auroras were reported from New England to the Dakotas, and southward to the Ohio Valley. Considerable damage was caused in West Virginia about the middle of the month by freshets in the Monongahela and Little Kanawha rivers and tributaries. A freshet was reported in the Wyoming Valley in the Susquehanna River basin, Pennsylvania, on the 26th.

On the 29th the Cape Fear River flooded its banks near Wilmington, N. C. Very dry weather was reported in parts of Nebraska, Kansas, Missouri, South Dakota, and south Minnesota. Destructive prairie fires occurred along the Cannon Ball, Heart, and Knife rivers, North Dakota, during the first part of the month.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for October, 1890, as determined from observations taken daily at 8 a. m. and 8 p. m. (75th meridian time), is shown on chart II by isobars. The departure of the mean pressure for October, 1890, obtained from observations taken twice daily at the hours named, from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me.	+ .008	Duluth, Minn.	+ .004
Boston, Mass.	+ .012	Memphis, Tenn.	+ .002
New York City.	+ .010	New Orleans, La.	+ .004
Philadelphia, Pa.	+ .015	Saint Louis, Mo.	+ .006
Washington City.	+ .012	Santa Fe, N. Mex.	- .007
Savannah, Ga.	+ .014	Denver, Colo.	- .002
Buffalo, N. Y.	+ .010	Fort Assiniboine, Mont.	- .006
Detroit, Mich.	+ .011	Salt Lake City, Utah.	- .006
Chicago, Ill.	+ .008	San Francisco, Cal.	- .018
Cincinnati, Ohio.	+ .008	San Diego, Cal.	- .015

The mean pressure was highest over Oregon and thence southeastward over north Nevada and northwest Utah, where it was above 30.10, and the mean values were above 30.05 over Mississippi and thence northeastward over east Tennessee. The mean pressure was lowest over east Nova Scotia and Cape Breton Island, where it was below 29.80, and was below 29.90 over a greater part of New England, in the lower Saint Lawrence valley, in the British Possessions north of Minnesota and North Dakota, and in the lower Colorado valley.

A comparison of the pressure chart for October with that of the preceding month shows a decrease in mean pressure in districts east of the Rocky Mountains and north of the Gulf States, the decrease being most marked at stations in

southeast New England and Nova Scotia, where the mean pressure was more than .25 lower than for September. Over the Rocky Mountain and plateau regions and on the Pacific coast, the mean pressure was higher than for the preceding month, the most marked increase being noted at stations in north California and Oregon, and thence eastward over the west part of the middle and the south part of the northern plateau regions, where it was more than .10. The area of high pressure which extended from the upper Mississippi valley eastward to the Atlantic coast in September had disappeared in October, and there had been a decrease of .15 to .25 in that region. The area of high pressure whose eastern limit touched the north Pacific coast in September had extended eastward and southeastward over the plateau region in October, with an increase in mean pressure of .05 to .10. An increase of about .05 occurred in the lower Colorado valley, while in the British Possessions north of Minnesota and North Dakota the decrease in mean pressure was more than .10.

The mean pressure was below the normal, save over extreme southern Florida, and on the Pacific coast north of the 40th parallel and thence eastward and southeastward over the northern and middle plateau regions. The greatest departures below the normal pressure occurred in Nova Scotia and on the extreme south New England coast, where they exceeded .20, whence the deficiencies became gradually less marked southward to Florida and westward to the plateau region. In the regions referred to where the mean pressure was above the normal the departures were less than .05.

The monthly barometric ranges at regular stations of the Signal Service are shown in the table of Signal Service data on the last two pages of the REVIEW.

Tabulated statement showing principal characteristics of areas of high and low pressure.

Barometer.	First observed.			Last observed.		Duration.	Velocity per hour.	Maximum pressure change and maximum abnormal temperature change in twelve hours and maximum wind velocity.															
	Date.	Lat. N.	Long. W.	Lat. N.	Long. W.			Station.	Rise.	Date.	Station.	Fall.	Date.	Station.	Direction.	Miles per hour.	Date.						
High areas.		°	°	°	°	Days.	Miles.		Inch.			°											
I.	1	45	73	42	68	2.0	9	Sydney, C. B. I.	.24	1	Montreal, Quebec	.7	1	Atlantic City, N. J.	se.	26	3						
II.	1	42	127	40	113	4.0	12	Cheyenne, Wyo.	.30	3	Calgary, N. W. T.	.26	2	Fort Canby, Wash.	sw.	48	4						
III.	6	43	129	50	93	4.5	22	Edmonton, N. W. T.	.42	8, 9	Cheyenne, Wyo.	.22	7	Helena, Mont.	ne.	40	8						
IV.	8	52	80	43	72	1.5	22	Parry Sound, Ont.	.28		8	Father Point, Quebec	.8	9	Anticosti Island, G. St. L.	nw.	26	8					
IVa.	7	35	80	33	82	4.5	13	Baltimore, Md.	.28	8	Atlanta, Ga.	.16	7	Pensacola, Fla.	ne.	26	9						
V.	12	44	123	38	70	4.0	37	Dubuque, Iowa.	.38	13	Dubuque, Iowa.	.24	13	Valentine, Nebr.	nw.	48	13						
VI.	14	45	130	34	81	4.0	35	Yarmouth, N. S.	.50	18	Nashville, Tenn.	.16	16	Cheyenne, Wyo.	w.	42	16						
VII.	17	44	110	47	65	6.5	23	Pueblo, Colo.	.40	18	Pueblo, Colo.	.19	18	North Platte, Nebr.	nw.	35	17						
VIII.	19	42	127	40	104	2.5	27	Medicine Hat, N. W. T.	.44	20	Denver, Colo.	.21	20	Helena, Mont.	w.	35	20						
IX.	24	45	125	27	94	4.0	30	Qu'Appelle, N. W. T.	.36	25	North Platte, Nebr.	.16	25	Chicago, Ill.	ne.	44	26						
X.	27	46	116	34	90	4.5	22	Parkersburg, W. Va.	.40	29	Mobile, Ala.	.19	31	Valentine, Nebr.	w.	44	28						
Mean.							3.8	23		.36		.18				38							
Low areas.									Fall.			Rise.											
I.	1	55	107	53	99	3.0	8	Calgary, N. W. T.	.32	2	Calgary, N. W. T.	.26	2	Rapid City, S. Dak.	n.	38	3						
II.	4	49	75	47	57	1.5	28	Halifax, N. S.	.34	5	Rockliffe, Ont.	.4	4	Anticosti Island, G. St. L.	ne.	40	4						
III.	5	38	97	46	73	4.0	16	Keokuk, Iowa.	.24	5	Pueblo, Colo.	.15	5	Grand Haven, Mich.	ne.	36	6						
IIIa.	7	38	74	40	70	0.5	25	Nantucket, Mass.	.06	7	Portland, Oregon.	.6	8	Block Island, R. I.	e.	36	7						
IV.	7	52	117	45	59	5.5	27	Edmonton, N. W. T.	.50	6	Concordia, Kans.	.23	7	Cheyenne, Wyo.	w.	48	7						
V.	7	33	115	54	90	7.0	14	White River, Ont.	.50	13	Cheyenne, Wyo.	.18	10	Chicago, Ill.	sw.	48	13						
VI.	15	38	99	44	60	3.0	32	Boston, Mass.	.68	17	Charleston, S. C.	.16	16	Block Island, R. I.	se.	56	17						
VII.	17	42	98	43	63	3.5	26	Yarmouth, N. S.	.45	20	Denver, Colo.	.15	17	Boston, Mass.	ne.	56	19						
VIII.	18	48	130	48	101	2.0	33	Calgary, N. W. T.	.34	18	Helena, Mont.	.20	18	Fort Canby, Wash.	se.	72	18						
VIIIa.	20	38	100	44	59	6.0	24	Baltimore, Md.	.44	23	Pueblo, Colo.	.23	19	Block Island, R. I.	ne.	50	25						
IX.	20	51	117	50	86	3.0	24	Minneapolis, Man.	.34	21	Fort Assiniboine, Mont.	.17	21	Fort Assiniboine, Mont.	sw.	48	25						
X.	26	36	70	45	62	1.5	30	Halifax, N. S.	.63	27	Albany, N. Y.	.9	27	Nantucket, Mass.	ne.	56	27						
XI.	28	45	85	51	60	2.0	35	Keokuk, Iowa.	.40	28	Rapid City, S. Dak.	.20	28	Norfolk, Va.	nw.	46	29						
Mean.							3.3	25		.40		.16				51							

AREAS OF HIGH PRESSURE.

During the month of October ten areas of high pressure were observed within the limits of stations of observation, six of which were first observed on the north Pacific coast to the west of the coast line; two first appeared over the northern plateau region; and two over the Saint Lawrence Valley or to the north of that region. Of the ten areas observed only five reached the Atlantic coast; four disappeared in the Mississippi Valley or on the eastern slope of the Rocky Mountains; and one apparently moved westward from the central plateau region and united with the succeeding high area on the north Pacific coast. The direction of movement was apparently to the north of east on the Pacific coast, but after the centre of high pressure reached the coast line the direction of movement changed to the southeast, the mean track of the high areas observed on the Pacific coast being represented by a right line passing from eastern Oregon to central Arkansas. With one exception the areas of high pressure which reached the Mississippi Valley changed direction of movement to the north of east, while the two areas observed in the region of the Saint Lawrence Valley moved to the southeast over New England, one disappearing to the eastward and the other extending southward over the Atlantic coast, finally disappearing by gradual decrease of pressure after reaching the south Atlantic states.

The following is a general description of the more prominent meteorological conditions attending each area of high pressure:

I.—The month opened with high area I covering the Saint Lawrence Valley, the barometer being low in the northern Rocky Mountain regions. This condition continued until the morning of the 2d, except that the high area moved to the New England coast, the area of low pressure had become more clearly defined in the upper Missouri valley, and a second area of high pressure had appeared on the north Pacific coast. Light showers occurred in the regions east of the Mississippi as the wind shifted to the southward under the influence of an advancing area of low pressure. The centre of this area passed to the southeast of New England during the 2d, and its disappearance was attended by local showers throughout southern New England. A secondary area of high pressure also formed over the Southern States, remaining almost stationary until the 4th, when the pressure gave way in the advance of a low area from the westward.

II.—Appeared on the Pacific coast on the afternoon of the 1st, and, after moving northeastward slowly until the afternoon of the 3d, it changed direction to the southeast and moved over the central plateau region, the centre reaching the eastern portion of Utah on the afternoon of the 5th, after which it was apparently drawn to the northwestward and formed a part of high area III, which was central west of Oregon on the 6th.

III.—Was central on the north Pacific coast on the 6th, and moved northeastward during the 7th and 8th, crossing the coast line and reaching the east portion of British Columbia on the last named date, it being preceded in that region by an area of low pressure of considerable energy. The northeasterly movement of this high area apparently continued during the southeasterly movement of the area of low pressure which immediately preceded it, and when the latter changed direction to the northeast after reaching the Dakotas, the course of the high area changed to the south of east, following the same general course. It became less clearly defined as it approached the centre of the continent, where it disappeared during the 11th, although its influence could be traced farther east on the succeeding day.

IV.—Probably extended over the Hudson Bay region during the 8th, and moved southward to the upper Saint Lawrence valley and thence to the New England coast, where it was central on the afternoon of the 9th. A secondary area of high pressure formed over the Southern States during the 7th and moved eastward to the Virginia coast, and the a. m. weather chart of the 10th indicates that these two areas had united, forming a single area, which remained almost stationary over the south Atlantic states until the 12th, when it disappeared under the

influence of a general storm which extended from the Gulf to the Lake region on the 13th.

V.—Appeared on the Pacific coast, central in western Oregon, on the 12th, and moved eastward, covering the plateau regions on the 13th, the Rocky Mountain regions on the night of the 13th, and the regions south of the Missouri Valley on the 14th, attended by killing frosts in Kansas and Colorado. It passed eastward over the Southern States during the 14th and 15th, including within its limits the greater portion of the northern states east of the Mississippi. It was attended by light frosts as far south as the northern portion of the Gulf States on the 15th, and disappeared to the east of the middle Atlantic coast on the 16th, moving to the northeast.

VI.—Appeared on the Pacific coast on the 14th, two days later than the area previously described, and moved eastward, following the same general course as that outlined for the preceding area. Light frosts occurred in northern California on the morning of the 14th and killing frosts in Oregon on the morning of the 15th. It passed over the central Rocky Mountain region on the morning of the 16th and to the lower Mississippi valley by the morning of the 17th, attended by light frosts generally throughout the northern portion of the Gulf States. It was last observed as central in the south Atlantic states on the 18th, well-defined areas of low pressure at that time being central in the upper lake region and northeast of New England.

VII.—Apparently formed over the plateau region on the 17th and moved eastward with increasing pressure, covering the eastern slope of the Rocky Mountains on the 18th and the Mississippi Valley on the 19th, causing killing frosts generally throughout the Northwest. During the 19th the centre of greatest pressure shifted from Missouri to the vicinity of Lake Superior, but the easterly movement continued, the southern half of the high area extending from Lake Superior to the Gulf and south Atlantic coasts. Killing frosts occurred in the upper Mississippi valley on the 20th, and light frosts from Tennessee and Kentucky eastward over Virginia and North Carolina. These conditions continued until the morning of the 21st, the area of high pressure remaining almost stationary north of Lake Superior, from which region it moved southeastward over northern New England, where it was central on the 22d, attended by killing frosts in the Lake region and the northern portions of New England and the middle Atlantic states. It moved slowly northeastward from northern New England during the 23d and 24th, the pressure decreasing rapidly at the centre owing to the advance of a severe tropical storm from the southwest.

VIII.—This area of high pressure was observed on the Pacific coast on the 19th. It passed the coast line and was central over the northern plateau region on the morning of the 20th, when it changed direction to the southeast, reaching the central Rocky Mountain region on the morning of the 21st, where it disappeared, owing to the southeast movement of an area to the north and a northeast movement of a severe storm from the Gulf region.

IX.—This area also appeared on the Pacific coast. It was apparently central near the Oregon coast on the 24th. It moved rapidly eastward, covering the entire Rocky Mountain region on the 25th, when it was central in the upper Missouri valley. It covered the eastern slope of the Rocky Mountains on the 26th, central in Nebraska. On the 27th it had reached western Arkansas, attended by killing frosts in central Mississippi. Its southerly movement continued, and when central in the west Gulf on the 28th its effect was indicated by killing frosts in Tennessee and North Carolina and light frosts in South Carolina and Georgia.

X.—Formed over the northern plateau region on the 27th, where it remained almost stationary during the 28th and 29th, extending southward to Arizona and New Mexico. On the morning of the 30th it was central over Colorado, and at the close of the month it covered the Mississippi Valley, being central in northern Mississippi and including within its area all states south of the Lake region.

AREAS OF LOW PRESSURE.

Eleven areas of low pressure have been traced from the regular telegraphic reports received during October. Eight of the areas thus observed passed over or near to the Atlantic coast north of Hatteras, N. C.; seven passed eastward across the meridian of the Mississippi Valley; and four apparently originated on the Pacific coast, three of which were first observed north of Washington, and one apparently developed in southeastern California. The region of greatest storm frequency included the south New England coast, while only a single disturbance was traced over the Southern States. The direction of movement was generally eastward while passing over the centre of the continent, the direction approaching the northeast as the storm centres moved towards the coast. In three instances storms moved north of the stations of observation while the centres were near the centre of the continent.

The following is a general description of the meteorological conditions observed during the transit of each low area over the field of observation:

I and II.—Neither of these depressions was at any time central within the limits of the United States, and they were unattended by any marked change in weather conditions except at northern stations and on the eastern slope of the Rocky Mountains. Low area I was central far to the north of Montana on the 1st, from which region it moved slowly eastward to Manitoba, where it was central on the 4th, the pressure being unusually low in that region on that date, when apparently the storm had attained its maximum energy. During the movement eastward from the Rocky Mountains from the 1st to the 4th, the attending trough of low pressure extended south to Texas, within which secondary low areas developed, which, however, quickly disappeared as the principal disturbance moved northward, apparently forced in that direction by the easterly movement of the high area from the Pacific. The barometer continued low north of Manitoba during the 5th, owing to the formation of a secondary disturbance which, although feeble, may be traced from that region to the upper Mississippi valley, where it disappeared on the 5th. Low area II apparently developed north of the Lake region on the 4th, and moved eastward over northern New England, reaching the vicinity of Halifax, N. S., on the 5th. It apparently increased in energy during the easterly movement, the minimum pressure observed being 29.28 at Sydney, C. B. I., on the afternoon of the 5th when the centre was near that station. Reports indicate that this storm was attended by severe gales after passing to the east of the coast line.

III.—Developed on the eastern slope of the Rocky Mountains south of Nebraska on the 5th, and passed northeastward to the Lake region as a disturbance of slight energy, although the area of rainfall included the greater portion of the country east of the 100th meridian. It was central in the lower lake region on the 6th, the bounding isobars indicating the development of a secondary disturbance to the southward, and on the morning of the 7th two centres of disturbance were noted, one on the middle Atlantic coast and the other in the upper Saint Lawrence valley. The high winds which occurred on the south New England coast during the 7th indicated the presence of a disturbance to the southward, and the shifting of the wind to the northward was probably due to the continued easterly course of a secondary disturbance. The principal disturbance lost energy after reaching the upper Saint Lawrence valley, and disappeared by an increase of pressure, being last marked as central near Montreal, Quebec, on the 8th.

IV.—Probably developed on the Pacific coast, but was first observed as central in Idaho on the 6th. It moved southeastward to the Dakotas during the 7th, three distinct depressions appearing within the trough of low pressure when it extended over the eastern slope of the Rocky Mountains, one central in North Dakota, one in South Dakota, and one in eastern Colorado. The a. m. weather chart of the 8th exhibited a well-defined area of low pressure central over the eastern Dakotas, from which region the disturbance moved almost directly north

until after the a. m. report of the 9th, when an easterly movement may be traced from the regular telegraphic reports. The track of this storm as given on chart I indicates the uncertainty of its movements after the 9th by the dotted course between Manitoba and the lower Saint Lawrence valley. The easterly movement of the attending depression can be readily traced from the regular reports, but the great increase in energy after approaching the Atlantic coast would indicate that this resulted from a secondary disturbance or that it united with an ocean storm moving northeastward near the Gulf Stream.

V.—This depression developed over the lower Colorado valley, where it remained, covering the southern and central plateau regions, until the 10th, its slow movement to the northeastward being attended by light snows on the 8th and 9th from Colorado westward to Nevada. It passed eastward over Colorado during the 11th, reaching the central Missouri valley on the morning of the 12th. It increased greatly in energy after passing to the east of the Rocky Mountains, and when central near La Crosse, Wis., on the morning of the 13th, the barometric pressure was 29.20. While central near La Crosse, Wis., this storm covered the central valleys, bounded by eight closed isobars, and heavy rains occurred from the Texas coast northward, and over the Lake region. Severe gales occurred in the Lake region on the 13th and 14th, the winds shifting to westerly as the storm moved directly north, and the high area from the Rocky Mountain regions passed eastward over the Southern States.

VI.—Developed over Kansas on the 15th in advance of an area of high pressure. It passed northeastward to the Lake region, reaching Lake Huron on the afternoon of the 16th, where it divided, a secondary disturbance developing over the middle Atlantic states and passing eastward over southern New England, causing severe gales on the 17th, while the principal disturbance disappeared after reaching the upper Saint Lawrence valley. The storm was unusually severe while moving along the New England coast. When the centre was near Yarmouth, N. S., on the afternoon of the 17th, the barometer had fallen to 29.16, attended by easterly gales, while northwesterly gales occurred on the Atlantic coast as far south as Hatteras, N. C. Heavy rains occurred throughout the Gulf and Atlantic states while this storm was moving eastward from the Mississippi Valley.

VII.—This disturbance developed in eastern Nebraska on the 17th, and moved directly eastward over the Lake region with increasing energy. While central over Lake Erie severe northwesterly gales were reported from the upper lake region, and these dangerous winds continued until the centre reached the south New England coast. The rain area covered the northern states east of the Mississippi, although the rainfall was generally light. The weather continued fair in the Southern States, except near the Florida and Gulf coasts, where heavy local rains were reported. This storm apparently increased in severity after reaching the New England coast, a maximum velocity of 56 miles an hour being reported at Boston, Mass., on the 19th, and on the same date a maximum velocity of 44 miles at Eastport, Me. The centre of disturbance apparently passed eastward south of Nova Scotia during the 20th.

VIII.—Was first observed on the north Pacific coast on the 18th, where severe southeasterly gales were reported. It passed to the east over British Columbia during the 19th, on the afternoon of which date it was central north of Montana, attended by an extensive trough of low pressure covering the Rocky Mountain districts. On the morning of the 20th two depressions were observed, one central north of North Dakota and the other over Kansas, extending from Texas northward over Nebraska. The succeeding reports indicate that the more northerly depression either passed to the north of stations of observation or became a part of the succeeding area of low pressure which was following it from British Columbia. The more southerly disturbance moved southward over eastern Texas to the west Gulf where it was central on the morning of the 21st, attended by heavy rains and strong northeasterly

winds. It changed direction to the northeast near to and south of Galveston, Tex., and passed to the east Gulf coast, causing severe gales. After the centre reached the vicinity of Mobile, Ala., the disturbance divided, one portion passing to the east of the Alleghany range and the other passing to the Ohio Valley. These disturbances united on the afternoon of the 23d, the centre being located on the middle Atlantic coast. It continued its northeasterly course during the 24th and 25th, reaching its maximum energy after the centre passed to the eastward of the coast line on the 24th, the maximum velocity of wind reported being 72 miles per hour at Block Island, R. I., and 48 miles per hour at Boston, Mass. On the morning of the 26th it was last observed as central to the southeast of Nova Scotia.

IX.—This storm also originated on the Pacific coast, although it was first located as central north of Idaho on the afternoon of the 20th. It passed to the east of the Rocky Mountains on the 21st, moved southward over Montana and the Dakotas on the 27th, and thence eastward to the region north of Lake Superior, where it disappeared during the 23d.

X.—Apparently developed over the Atlantic to the east of North Carolina and in the vicinity of the Gulf Stream on the

26th, at least from the reports at hand it is impossible to trace it farther to the south. Northwestern gales were reported at Hatteras, N. C., on the 26th, and northeasterly gales on the south New England coast on the 27th. It increased in intensity during its northerly movement, the barometer falling to 28.88 at Halifax, N. S., when the centre of disturbance passed northward near that station on the 27th. On the regular telegraphic weather chart it was located as central near Bird Rocks, Gulf of Saint Lawrence, on the morning of the 28th. Additional information relative to this storm is given under the heading "North Atlantic Storms."

XI.—Developed in the upper lake region and was probably a secondary disturbance attending the storm previously described. It moved southeastward to the lower lake region during the night of the 28th, attended by general rains throughout the Northern States and light snows in the upper lake region. It passed eastward over the middle Atlantic states during the 29th, and thence northeastward over New England and the lower Saint Lawrence valley, where it was central on the morning of the 30th, attended by easterly gales over the Gulf of Saint Lawrence and strong westerly winds on the New England and middle Atlantic coasts.

NORTH ATLANTIC STORMS FOR OCTOBER, 1890 (pressure in inches and millimetres; wind-force by Beaufort scale).

The paths of the storms that appeared over the north Atlantic Ocean during October, 1890, are shown on chart I. These paths have been determined from international observations by captains of ocean steamships and sailing vessels received through the co-operation of the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Ten storms have been traced for October, 1890, the average number traced for the corresponding month of the last 7 years being 12. Of the storms traced for the current month 6 advanced eastward from the American continent, 2 apparently developed over mid-ocean, one is first located over the Banks of Newfoundland, and one appeared off the middle Atlantic coast. The storms generally moved northeastward after passing the 50th meridian, and no storms were traced from coast to coast. No well-defined cyclones appeared over or near the West Indies.

In October during the last 17 years 8 severe storms advanced northward from the Caribbean Sea. The storms generally recurved over or near extreme western Cuba and the east part of the Gulf of Mexico and passed thence along or off the Atlantic seaboard to the vicinity of Newfoundland. In two instances, only, during this period, in 1886 and 1887, have storms of pronounced strength advanced from the Caribbean Sea over the Gulf of Mexico west of the 90th meridian in October. In October, 1889, terrific gales swept over the British Isles on the 7th, causing many shipwrecks; in the northern parts of England and Ireland many houses were demolished and numerous trees uprooted, and the barometer fell below 28.70 (729) over Scotland. October is a month of severe storms in the middle latitudes of the north Atlantic Ocean. In the current month severe storms prevailed west of the 30th meridian during a greater part of the month, while over the eastern part of the ocean and near the British Isles the weather was unusually fine and settled for the season.

October, 1890, opened with a storm of great energy central northeast of Newfoundland, with pressure below 29.00 (737) and strong to whole gales. By the 2d this storm had moved northeast to about the 32d meridian, without evidence of loss of energy, after which it disappeared north of the region of observation. A telegram from Havana, Cuba, received 12.40 p. m. of the 1st, stated that a disturbance of moderate energy was southwest of that station, and a telegram received 3.20 p. m. of the 2d stated that a disturbance was west of Havana. Disastrous gales were reported over the North Sea on the 2d and 3d. From the 3d to 5th a storm of moderate strength moved

northeastward about midway between the Azores and the Grand Banks, after which it apparently recurved westward and united with a storm central near Newfoundland on the 6th. During the 5th and 6th a storm moved from Nova Scotia to off the southern extremity of Newfoundland, with fresh to strong gales and pressure below 29.40 (747), after which it advanced rapidly northeastward and disappeared north of the region of observation after the 7th. On the 7th a storm, with pressure below 29.50 (749) and fresh gales, was central over the Grand Banks, from which position it passed eastward to about the 38th meridian by the 8th, with pressure below 29.10 (739) and fresh to strong gales, after which it disappeared north of the region of observation. On the 8th a storm which had moved off the middle Atlantic coast during the 7th was central off the south New England coast, whence it moved eastward to south of the Grand Banks by the 9th, with pressure below 29.40 (747) and fresh to strong gales. By the 10th this storm had moved northeastward to east of the Grand Banks, with pressure below 29.00 (737) and heavy gales, after which it moved northeastward and disappeared in the direction of Iceland after the 12th. During the 11th and 12th a severe storm advanced from the Gulf of Saint Lawrence to south of Newfoundland, attended by disastrous gales over the Gulf of Saint Lawrence, Cape Breton Island, and eastern Nova Scotia. During the 13th and 14th this storm remained nearly stationary over the Banks of Newfoundland, with pressure falling to about 29.20 (742) and fresh to strong gales, and on the 15th was central off the southeast extremity of Newfoundland, with a slight loss of energy. By the 16th this storm had moved north-northeast beyond the region of observation. The eastward advance of this storm was apparently retarded during the 13th and 14th by high pressure to the eastward.

On the 15th and 16th the pressure was low over the British Isles and severe gales were reported over the Irish Sea and along the coasts of Great Britain. On the 17th a severe storm moved northeastward off the New England coast, with pressure below 29.40 (747) and heavy gales. On the 18th this storm was central south of Newfoundland, where there was an apparent increase in energy, and by the 19th the storm centre had moved to the east of the Grand Banks, after which it passed northeast and disappeared north of the region of observation, attended throughout by storms of great violence. During the 19th a storm moved eastward off the south New England coast, and on the 20th was central off the western extremity of Nova Scotia, with pressure below 29.40 (747) and

fresh to strong gales. By the 21st this storm had advanced to south of Newfoundland, where a loss of energy was shown, after which it moved eastward and apparently dissipated. During the 21st and 22d a storm of considerable strength moved eastward over the north part of the Gulf of Mexico, and on the 23d was central off the south and middle Atlantic coasts. During the 24th and 25th this storm moved eastward south of the 40th parallel to the 65th meridian, with pressure below 29.40 (747) and fresh to strong gales. By the 26th the storm had moved to the west edge of the Grand Banks, with an apparent increase in energy, after which it recurved northward and probably united with a storm which moved northward over Nova Scotia during the night of the 27-28th. Mr. Jos. Ridgway, jr., observer, Saint Thomas, W. I., reports, under date of the 26th, "that the barometer had been falling at Saint Thomas since the 20th, reaching the lowest point, 29.89 (759), at 5 p. m., 25th. The morning of the 24th the wind was easterly, and later in the day it veered to se., and on the 25th it veered from se. to sw. The tide had been unusually high for several days." These conditions were probably due to the storm which moved from the Gulf of Mexico along the Atlantic coast from the 21st to 26th. On the 27th a storm of considerable energy, with pressure below 29.20 (742), appeared between Nova Scotia and Bermuda, whence it moved northward to the Gulf of Saint Lawrence by the 28th, with pressure below 29.00 (737) and heavy gales, after which it disappeared north of the region of observation. During the 30th and 31st a storm moved northeastward over the Canadian Maritime Provinces and the Gulf of Saint Lawrence and disappeared north of Newfoundland, with pressure below 29.30 (744) on the 30th.

FOG IN OCTOBER.

The limits of fog-belts west of the 40th meridian, as determined from reports of shipmasters, are shown on chart I by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on 19 dates; and between the 55th and 65th meridians on 3 dates. No fog was reported west of the 65th meridian. Compared with the corresponding month of the last 3 years the dates of occurrence of fog near the Grand Banks numbered 6 more than the average; and between the

55th and 65th meridians 2 less than the average. West of the 65th meridian the average number of days for which fog was reported for the last 3 years is 3. On the dates fog was reported east of the 65th meridian it occurred with the approach or passage to the northward of general storms. Dense fog was reported at New York City on the 23d and 24th with the advance along the middle Atlantic coast of a general storm.

OCEAN ICE IN OCTOBER.

The following table shows the southern and eastern limits of the region within which icebergs or field ice were reported for October during the last 8 years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
October, 1883.....	46 56	46 22	October, 1883.....	46 56	46 22
October, 1884.....	Off Cape Race.		October, 1884.....	46 56	50 55
October, 1885.....	48 21	47 12	October, 1885.....	48 21	47 12
October, 1886.....	47 34	49 43	October, 1886.....	46 03	46 37
October, 1887.....	42 58	50 02	October, 1887.....	42 58	50 02
October, 1888.....	51 43	55 36	October, 1888.....	51 43	55 36
October, 1889.....	44 32	49 28	October, 1889.....	46 30	45 59
October, 1890.....	44 47	49 33	October, 1890.....	47 56	45 45
Mean.....	45 55	50 11	Mean.....	47 10	48 33

For the current month ice was reported more than 1° south and nearly 3° east of the average southern and eastern limits of ice for October, as determined from reports of the last 7 years. The southernmost ice reported was a medium sized iceberg noted on the 13th in the position given, and the easternmost ice reported was a large iceberg noted on the 5th in the position given. The iceberg of the 5th, referred to, was east of the extreme eastern limit of ice for October as shown by reports of the last 7 years. As is usual in October ice was most frequently encountered along the east edge of the Banks of Newfoundland north of the 45th parallel, and in and east of the Straits of Belle Isle. In quantity the ice reported for the current month exceeded the average for October.

The limits of the region within which Arctic ice was reported for October, 1890, are shown on chart I by ruled shading.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

Many of the voluntary stations do not have standard thermometers or shelters.

The distribution of mean temperature over the United States and Canada for October, 1890, is exhibited on chart II by dotted isotherms. In the table of Signal Service data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

The mean temperature was highest over south Florida and in the lower Rio Grande valley, where it was above 75, and the mean values were above 70 over the Florida Peninsula, along the west Gulf coast, and in the lower Rio Grande valley. South of a line traced from the South Carolina coast irregularly westward to central Texas, and thence southwestward to the middle Rio Grande valley, over the southwest part of the southern plateau, in southern California, and at stations in the San Joaquin and Sacramento valleys the mean temperature was above 65. The mean temperature was lowest at elevated stations in central Colorado, where it was below 35, and the mean readings were below 40 in the lower Saint

Lawrence valley, in extreme northwest Michigan, northeast Minnesota, and in the Saskatchewan Valley.

The mean temperature was above the normal over the northern portion of the country from east Washington to the Gulf of Saint Lawrence, along the Pacific coast south of the 40th parallel, over the southwest part of the plateau region, on the southeast slope of the Rocky Mountains, in the lower Rio Grande valley, and over south Florida; elsewhere the month was cooler than usual. The greatest departures above the normal temperature were noted in Manitoba and on the south Pacific coast, where they ranged to 4.7 at Minnedosa, Man., and to 4.8 at Los Angeles, Cal. The most marked departures below the normal temperature were reported in the interior of Alabama and Georgia, and in eastern Tennessee, where they equalled or exceeded 3.0.

The warmest October along the middle and south Atlantic coasts and in Florida occurred in 1881, when the mean temperature was 3 to 5 above the normal; from the northeast and middle-eastern slopes of the Rocky Mountains eastward over the Ohio Valley, the Lake region, New York, and New England, in 1879, when the mean temperature was 4 to 8 above the normal; from the Dakotas westward to the north Pacific coast in 1889, when the mean temperature was 4 to 6 above the normal; along the middle Pacific coast in 1887, when the mean temperature was 3 to 4 above the normal; and at Los Angeles, Cal., in 1890, when the mean was 4.8 above the normal and 1.5

above the highest mean previously reported for October. The coolest October over a greater part of New England and south-east New York occurred in 1888, when the mean temperature was 2 to 5 below the normal; along the middle and south Atlantic coasts in 1876, when the mean temperature was 6 to 7 below the normal; over the east part of the lower lake region in 1889, when the mean temperature was about 5 below the normal; in the valley of the Red River of the North, at Lake Superior stations, in northeast Iowa, and on the Texas coast in 1887, when the mean temperature was 4 to 6 below the normal; in the middle Mississippi and lower Missouri valleys in 1873, when the mean temperature was 5 to 7 below the normal; from the upper Missouri valley westward to the north Pacific coast and thence southward along the Pacific coast to the 35th parallel in 1881, when the mean temperature was 3 to 5 below the normal; over the plateau region south of the 40th parallel in 1883, when the mean was about 5 below the normal; and on the south Pacific coast in 1886, when the mean temperature was 3 to 4 below the normal. From the above it will be noted that in 1881, when the mean temperature was the highest ever recorded for October along the middle and south Atlantic coasts, the month was the coolest October on record from the upper Missouri valley to the north Pacific coast and thence southward along the Pacific coast to the 35th parallel, and that in 1889, when the month was unprecedentedly warm from the upper Missouri valley to the north Pacific coast, the month was the coolest October ever noted at stations in the east part of the lower lake region.

DEVIATIONS FROM NORMAL TEMPERATURE.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for October for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for October, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly mean for October, during the period of observation and the years of occurrence:

State and station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1890.	(4) Departure from normal.	(5) Extreme monthly mean for Oct.			
						Highest.	Year.	Lowest.	Year.
<i>Arkansas.</i>			Years	°	°	°		°	
Lead Hill	Boone	60.1	9	59.9	- 0.2	64.0	1881	56.0	1885
<i>California.</i>									
Sacramento	Sacramento	61.7	37	53.9	- 7.8	69.9	1875	53.9	1890
<i>Connecticut.</i>									
Middletown	Middlesex	50.0	23	49.1	- 0.9	54.7	1871	45.5	1888
<i>Florida.</i>									
Merritt's Island	Brevard	75.7	8	75.5	- 0.2	79.0	1882	73.1	1885
<i>Georgia.</i>									
Forayth	Monroe	67.3	16	64.7	- 2.6	75.4	1884	61.7	1885
<i>Illinois.</i>									
Peoria	Peoria	53.9	31	54.7	+ 0.8	62.7	1879	45.2	1869
Riley	McHenry	47.7	34	48.9	+ 1.5	56.0	1879	38.6	1869
<i>Indiana.</i>									
Vevay	Switzerland	55.9	24	56.4	+ 0.5	65.0	1879	43.2	1869
<i>Iowa.</i>									
Cresco	Howard	45.8	18	44.9	- 0.9	54.1	1879	41.2	1873
Monticello	Jones	49.0	35	48.0	- 1.0	58.0	1879	36.0	1873
Logan	Harrison	52.6	16	53.8	+ 1.2	60.7	1879	48.5	1875
<i>Kansas.</i>									
Lawrence	Douglas	54.4	22	54.8	+ 0.4	60.5	1879	44.0	1869
Wellington	Sumner	56.6	11	60.1	+ 3.5	60.6	1879, '84	53.3	1880, '83
<i>Louisiana.</i>									
Grand Coteau	Saint Landry	68.7	9	66.8	- 1.9	75.5	1883	64.8	1885
<i>Maine.</i>									
Orono	Penobscot	45.6	20	45.5	- 0.1	49.7	1879	42.1	1888
<i>Maryland.</i>									
Cumberland	Allegany	50.8	31	52.7	+ 1.9	60.0	1881	41.8	1869
<i>Massachusetts.</i>									
Amherst	Hampshire	48.8	54	48.1	- 0.7	56.0	1879	42.8	1841
Newburyport	Essex	49.4	12	48.5	- 0.9	55.0	1879	45.1	1888
Somerset	Bristol	52.5	18	51.5	- 1.0	58.1	1879	47.6	1874
<i>Michigan.</i>									
Kalamazoo	Kalamazoo	49.8	14	51.0	+ 1.2	54.5	1879	45.7	1887
Thornville	Lapeer	50.4	13	50.0	- 0.4	58.5	1879	45.6	1889
<i>Minnesota.</i>									
Minneapolis	Hennepin	45.3	25	44.5	- 0.8	56.1	1879	36.5	1869
<i>Montana.</i>									
Fort Shaw	Lewis & Clarke	49.0	21	49.1	+ 0.1	58.1	1879	34.6	1881
<i>New Hampshire.</i>									
Hanover	Grafton	44.9	55	44.6	- 0.3	52.4	1879	38.6	1836

Deviations from normal temperature—Continued.

State and station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1890.	(4) Departure from normal.	(5) Extreme monthly mean for Oct.			
						Highest.	Year.	Lowest.	Year.
<i>New Jersey.</i>			Years	°	°	°		°	
Moorestown	Burlington	53.4	27	53.6	+ 0.2	59.5	1879	48.6	1888
South Orange	Essex	52.8	20	51.4	- 1.4	58.1	1879	47.2	1871
<i>New York.</i>									
Cooperstown	Otsego	46.4	36	45.5	- 0.9	53.3	1879	40.7	1865
Palermo	Oswego	47.0	30	47.9	+ 0.9	53.9	1879	41.8	1889
<i>North Carolina.</i>									
Lenoir	Caldwell	56.7	19	55.0	- 1.7	66.4	1878	48.0	1874
<i>Ohio.</i>									
N'th Lewisburgh	Champaign	51.9	58	53.2	+ 1.3	58.0	1852	43.0	1869
Wauseon	Fulton	50.4	20	50.1	- 0.3	59.0	1879	45.2	1889
<i>Oregon.</i>									
Albany	Linn	52.2	10	51.0	- 1.2	56.3	1885	48.7	1881
Eola	Polk	51.6	19	50.0	- 1.6	59.7	1876	45.4	1873
<i>Pennsylvania.</i>									
Dyberry	Wayne	46.5	22	45.8	- 0.7	53.4	1879	41.2	1869
Grampian Hills	Clearfield	47.7	26	48.2	+ 0.5	56.4	1879	39.2	1869
Wellsborough	Tioga	50.2	11	46.5	- 3.7	60.0	1880	41.2	1889
<i>South Carolina.</i>									
Statesburgh	Sumter	63.6	9	61.7	- 1.9	69.0	1881	59.8	1885, '88
<i>Tennessee.</i>									
Austin	Wilson	59.5	21	58.2	- 1.3	70.2	1879	52.5	1888
<i>Texas.</i>									
New Ulm	Austin	69.7	17	69.4	- 0.3	73.9	1881	65.8	1873
<i>Vermont.</i>									
Strafford	Orange	46.8	17	45.6	- 1.2	52.8	1879	40.6	1888
<i>Virginia.</i>									
Birdsneest	Northampton	61.0	22	55.9	- 5.1	69.2	1881	54.5	1869
<i>Washington.</i>									
Fort Townsend	Jefferson	50.6	14	49.6	- 1.0	54.6	1875	48.6	1879
<i>Wisconsin.</i>									
Madison	Dane	47.9	21	48.2	+ 0.3	59.4	1864	39.8	1869

MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 99, at Los Angeles, Cal., on the 21st and 27th. The maximum temperature rose to or above 90 in central and northeast Florida, in the Rio Grande Valley, in the Colorado Valley from extreme south Nevada southward, in California south of the 35th parallel, and at Red Bluff, Cal. The maximum temperature was above 80 north of a line traced from the Virginia coast to Lake Erie, thence westward to the lower Missouri valley, thence northward over the Dakotas, thence southward to south New Mexico, thence westward to central Arizona, and thence northwestward to northern California. The lowest maximum temperature was noted on the north Pacific coast and over the northern plateau, where it fell below 70. The reports of United States Army post surgeons and voluntary observers show that the maximum temperature rose to or above 100 at the following-named stations only: Merced, Cal., 118, and Casa Grande and Gila Bend (2), Cal., 100. At Galveston, Tex., 20 years record, the maximum temperature was 2 higher than previously reported for October, noted in two or more preceding years, and at Springfield, Ill., 12 years record, the maximum temperature was as high as previously reported for October, being the same as for 1879.

The lowest temperature reported by a regular station of the Signal Service was 14, at Huron, S. Dak., on the 26th. The minimum temperature was below 30 north of a line traced from the New England coast over the lower lake region, thence northwestward over lower Michigan, thence southwestward to the south part of the southern plateau, thence northwestward to west central Oregon, and thence northward (describing a loop to the eastward over the Columbia Valley) to British Columbia. The highest minimum temperature was 64, at Key West, Fla., and the minimum values were above 50 along the immediate west Gulf coast. At Key West, Fla., the minimum temperature was 1° lower than previously reported for October. The reports of United States Army post surgeons and voluntary observers show the following minimum temperatures in states and territories where temperature falling to or below 20 was reported: Breckenridge, Colo., -10; Alliance, Nebr., and Pioche, Nev., 8; Lakin, Kans., 15; Howard, S. Dak., Alta, Utah, and Henry's Lake, Idaho, 10; Fort Logan, Mont., Steele, N. Dak., and North Powder, Oregon, 11; Pokegama Falls,

Minn., and West Milan, N. H., 12; Dale Enterprise, Va., and Camp Pilot Butte, Wyo., 13; Stilson, Iowa, 15; Waterville, Wash., and Haywood, Wis., 16; Chama, N. Mex., 17; Adrian, Mo., 18; Atwood and Sandwich, Ill., Point Isabel, Ind., Fairfield, Me., and East Berkshire, Vt., 20.

LIMITS OF FREEZING WEATHER.

The southern and western limits of freezing weather are shown on chart II by a line traced from the middle New England coast over the lower lakes, thence to the middle Ohio valley, thence southeastward to north South Carolina and Georgia, thence westward over the south part of the southern plateau, thence northwestward to west-central Oregon, thence eastward over the valley of the Columbia River, thence westward to west-central Washington, and thence northward to British Columbia.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature are given in the table of Signal Service data. The greatest monthly ranges of temperature occurred in the middle Missouri valley, where they exceeded 60, whence they decreased eastward to less than 30 on the south New England coast, southeastward to less than 25 over extreme south Florida, and to less than 40 on the immediate east Gulf coast, southward to 40 on the west Gulf coast, southwestward to less than 50 over the southern plateau and on the south Pacific coast, and westward to less than 40 on the middle Pacific coast, and to less than 30 at stations on the north Pacific coast.

FROST.

The first killing frost of the season was reported as follows: 3d, Carson City, Nev. 5th, Fort Morgan and Magnolia, Colo.; Moab, Utah. 7th, Fort Stanton, N. Mex. 8th, Watkins, Colo. 9th, Roseburgh, Oregon. 10th, Albany and McMinnville, Oregon; Keeler and Susanville, Cal.; Eastport, Me. 11th, Tatoosh Island, Wash.; Walnut Grove, Ariz. 12th, Fort Apache, Whipple Barracks (Prescott), and Holbrook, Ariz.; Glendive, Mont. 13th, Strawberry, Ariz.; Santa Fé, N. Mex. 14th, Cañon City, Hugo, Lamar, Yuma, and Pueblo, Colo.; Dodge City and Wichita, Kans.; Springfield, Mo. 15th, Deer Trail, Colo.; Lunenburg, Vt. 16th, Sheridan Lake, Colo. 17th, Centreville and Ironton, Mo. 18th, Bennet, Colo.; New Frankfort, Mo. 19th, Keokuk and Clarinda, Iowa; Kansas City, Excelsior Springs, and Wither's Mills, Mo.; Howe, Nebr. 20th, Springfield, Louisville, Oswego, and Riley, Ill.; Clinton and McCausland, Iowa; Shelbyville, Ky.; Trenton, Tenn. 21st, Forest Park (Saint Louis), Mo.; Indianapolis and Seymour Ind.; Toledo, Napoleon, Tiffin, and Wauseon Ohio; Detroit, Mich.; Marion and Wytheville, Va.; Morganton and Lenoir, N. C.; Portland, Me. 22d, Boston and Fall River, Mass.; Albany, N. Y.; Cleveland, Sandusky, Garrettsville, Orangeville, and Vienna, Ohio; Lava, N. Mex. 23d, Brady, Tex. 26th, Topeka, Kans. 27th, Hot Springs, Osceola, and Winslow, Ark.; Newnan, Ga.; Marksville La.; Meridian and Hernando, Miss.; Saint Louis, Lebanon, and Willow Springs, Mo.; Leavenworth, Lebo, and Morse, Kans.; Chicago, Ill.; Shiloh, Ohio. 28th, Louisville, Ky.; Vaiden, Miss.; Raleigh, Chapel Hill, Mount Pleasant, and Washington, N. C.; Columbia and Statesburgh, S. C.; Athens, Ga.; Chattanooga, Nashville, Cumberland Gap, Andersonville, Jacksboro, Parksville, Nunnally, Austin, and Hohenwald, Tenn.; Nottoway C. H., Va. 30th, Vevay, Ind.;

Lexington, Ky.; Kenton and Wooster, Ohio; Oak Ridge, N. C.; Dale Enterprise and Summit, Va.; Ogdensburg, N. Y. 31st, Montgomery and Columbiana, Ala.; Atlanta and Athens, Ga.; Agricultural College, University, Batesville, Palo Alto, Pontotoc, and Holly Springs, Miss.; Memphis, Ashwood, Dyersburgh, Covington, Grand Junction, Milan, Florence Station, Franklin, and Clarksville, Tenn.; Canton, Ky.; Cairo, Ill.; Amana, Iowa; Globe, Kans.; Jacksonborough, Ohio; Pittsburgh, Pa.; Washington City; Baltimore and Barren Creek Springs, Md.; Egg Harbor City and Readington, N. J.; Bolar, Lexington, and Staunton, Va.; New York City.

The first black frost of the season was reported at Olympia, Wash., on the 9th; at Tatoosh Island, Wash., on the 13th; at Santa Fé, N. Mex., and near Leavenworth Kans., on the 14th; at Wichita, Kans., on the 16th; at Erie, Pa., Grand Haven, and Port Huron, Mich., on the 22d; at Kansas City, Mo., on the 27th; at Knoxville, Tenn., on the 28th; at Milwaukee, Wis., on the 30th; and at Nashville, Tenn., on the 31st.

Compared with the average date of first killing frost in the respective localities the killing frost of the 14th at Springfield, Mo., and of the 31st at Atlanta, Ga., was about seasonable; that of the 9th at Roseburgh, Oregon, was about 3 weeks early; that of the 14th at Dodge City, Kans., and of the 27th at Hot Springs, Ark., was about one week late; that of the 28th at Columbia, S. C., Chattanooga and Nashville, Tenn., and of the 31st at Cairo, Ill., was about two weeks late; that of the 21st at Indianapolis, Ind., of the 27th at Saint Louis, Mo., and Leavenworth, Kans., and of the 31st at Baltimore, Md., and Washington City was about 3 weeks late; and that of the 28th at Louisville, Ky., and of the 30th at Dale Enterprise, Va., was about 4 weeks late.

Frost occurred as far south as the north part of the Florida Peninsula on the 28th; in extreme west Florida on the 20th, 24th, 27th, and 31st; in extreme south Mississippi on the 27th and 31st; in extreme south Louisiana on the 27th to 29th and 31st; in central Texas on the 5th, 6th, 10th, 23d, 24th, and 31st; to south New Mexico on the 4th, 7th, 13th, and 22d; in south-central and southeast Arizona on the 11th to 15th and 20th; and in the neighborhood of Los Angeles and San Diego, Cal., on the 10th and 11th.

Compared with September, 1890, the limit of frost was about 5° farther south in the Atlantic coast states; 7° to 8° farther south in the Mississippi Valley; and about 5° farther south in the plateau region and on the Pacific coast.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for October, 1890:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
Boston, Mass.	58.6	47.9	10.7	53.9	51.0
Canby, Fort, Wash.	54.1	51.3	2.8	52.6	52.4
Charleston, S. C.	78.1	67.5	10.6	73.3	67.6
Eastport, Me.	51.6	49.1	2.5	50.4	46.6
Galveston, Tex.	82.0	65.0	17.0	73.9	72.0
Key West, Fla.	87.0	74.5	12.5	83.3	79.6
Portland, Oregon	61.8	52.8	9.0	55.8	52.6

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for October, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart III. In the table of Signal Service data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in

the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest monthly precipitation reported was 14.80, at

Neah Bay, Wash. At Port Moody, B. C., 12.90 fell, and at Juneau, Alaska, the monthly rainfall was 11.31. In extreme west Fla., east-central N. J., extreme west N. Y., on Long Island, in R. I., central Mass., and west-central lower Mich., more than 10.00 was recorded. Over a greater part of southern Cal., and thence northward over the central and western parts of the state to the 40th parallel, no precipitation was reported; and the monthly precipitation was less than 0.50 generally in northern and eastern Cal., southern Oregon, Nev., west Utah, and west Ariz. Over a greater part of the northern and middle plateau regions, the east and west parts of the southern plateau, over a large portion of the eastern slope of the Rocky Mountains, in the middle Missouri valley, in adjoining parts of east-central Mo. and west Ill., and in the Rio Grande Valley above Rio Grande City, Tex., less than 1.00 fell.

The precipitation was generally in excess of the average for October east of the Missouri and Mississippi rivers, except over the north part of the upper lake region and thence eastward to the west coast of the Gulf of Saint Lawrence, in the middle Mississippi valley, on the N. C. coast, and over south Fla. To the west of the Mississippi and Missouri rivers the precipitation was deficient, save on the north Pacific coast, from southeast Wyo. west of south over Ariz., in east-central Tex., south-central Ind. T., and at Rio Grande City, Tex. The greatest excess in precipitation occurred on the southeast New England coast, where it exceeded 6.00; in extreme northwest Wash. and the adjoining part of British Columbia, where it ranged from 4.00 to nearly 6.00; in east-central Tex., where it exceeded 5.00; in extreme west Fla., where it exceeded 4.00; and in northeast Iowa, at Rio Grande City, Tex., and on Prince Edward Island, Gulf of Saint Lawrence, where it exceeded 3.00. The most marked deficiency in precipitation occurred at Key West, Fla., where it was nearly 4.00, and the deficiency was more than 2.00 at Eastport, Me., Quebec, on the N. C. coast, at Springfield, Ill., and Escanaba, Mich.

Considered by districts the average percentage of the normal in districts where the precipitation was in excess was about as follows: east Gulf states, 174 per cent.; New England, 170 per cent.; lower lakes, 164 per cent.; middle Atlantic states, 155 per cent.; southern plateau, 137 per cent.; Ohio Valley and Tennessee, 128 per cent.; extreme northwest, 126 per cent.; Rio Grande Valley, 119 per cent.; west Gulf states, 116 per cent.; upper Mississippi valley, 108 per cent.; north Pacific coast, 103 per cent. In districts where the precipitation was deficient the percentage of the normal was about as follows: at Key West, Fla., 34 per cent.; at Spokane Falls, Wash., 49 per cent.; middle-eastern slope of the Rocky Mountains, 66 per cent.; Missouri Valley, 71 per cent.; and upper lakes and middle plateau, 96 per cent. For the middle Pacific coast, where trace of precipitation was reported for the current month, the normal is 1.06, and on the south Pacific coast, where the average was 0.02, the normal is 0.44. On the south Atlantic coast and on the northeast slope of the Rocky Mountains the precipitation for October, 1890, about equalled the October average.

For the period January to October, 1890, inclusive, the precipitation in the Ohio Valley and Tennessee, the lower lake region, and on the middle Pacific coast, averaged about one-fourth greater, and in New England and the west Gulf states, one-tenth to two-tenths greater than the average, while in the Rio Grande and Missouri valleys, the northeast and middle-eastern slopes of the Rocky Mountains, the middle plateau region, and on the south Pacific coast the precipitation averaged two-thirds to three-fourths of the normal amount for the period named.

The heaviest precipitation ever reported for October occurred at Newburyport and Somerset, Mass., Dyberry and Grampian Hills, Pa., Cumberland, Md., Pensacola, Fla., Grand Coteau, La., Cleveland, Ohio, Port Huron and Thornville, Mich., Fort Buford, N. Dak., Fort Assiniboine, Mont., and Yuma, Ariz., in 1890, when the excess above the normal varied from nearly 6.00 at Somerset, Mass., to nearly 1.00 at Fort Assiniboine,

Mont.; in south New England, eastern N. Y., Pa., and La., in 1877, when the excess varied from 4.00 to 6.00; in the middle and lower Ohio valleys and west Tennessee in 1883, when the excess varied from 3.00 to 6.00; in the upper Mississippi valley in 1881, when the excess varied from 2.00 to 5.00; and in Cal. in 1889, when the excess varied from 2.00 to 7.00.

The least precipitation reported for October occurred at Concordia, Kans., Abilene, Tex., Walla Walla, Wash., and San Francisco, Cal., in 1890, the deficiency varying from 1.15 at San Francisco, Cal., to more than 2.00 at Abilene, Tex.; in Me. in 1874, when the deficiency varied from 2.00 to 3.00; also from west Pa. over east Va., and in the lower Mississippi valley, in 1874; from the south Atlantic coast to the Mississippi River in 1886, when the deficiencies varied from 2.00 to 6.00; from the upper Mississippi valley and the west part of the upper lake region westward over N. Dak. and Mont. in 1889, when the deficiencies varied from 1.00 to 3.00. It will be noted in connection with the distribution of precipitation for October, 1889, that it was the heaviest ever reported for Cal., and the least ever noted over the northern part of the country from Wash. to the upper lakes.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for October for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for October, 1890; (4) the departure of the current month from the average; (5) and the extremes for October during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Oct.	(2) Length of record.	(3) Total for Oct., 1890.	(4) Departure from average.	(5) Extremes for Oct.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		Inches	Years	Inches	Inches	Inches		Inches	
Lead Hill.....	Boone.....	4.70	9	2.25	-2.42	18.11	1883	0.10	1886
California.									
Sacramento.....	Sacramento.....	0.80	54	0.01	-0.79	7.01	1889	0.00	*
Connecticut.									
Middletown.....	Middlesex.....	3.91	29	7.52	+3.61	14.51	1869	0.89	1868
Florida.									
Merritt's Island.....	Brevard.....	5.74	12	3.85	-1.89	11.94	1886	1.33	1889
Georgia.									
Forsyth.....	Monroe.....	3.82	16	5.89	+3.07	7.86	1879	0.10	1884
Illinois.									
Peoria.....	Peoria.....	2.64	34	3.45	+0.81	5.68	1877	0.70	1860
Riley.....	McHenry.....	2.67	39	5.38	+2.71	6.81	1881	0.29	1867
Indiana.									
Logansport.....	Cass.....	2.84	14	2.82	-0.02	5.47	1881	1.00	1889
Iowa.									
Vevay.....	Switzerland.....	2.55	25	3.07	+0.52	7.67	1883	0.28	1879
Kansas.									
Cresco.....	Howard.....	2.29	19	3.98	+1.69	8.06	1881	0.13	1889
Monticello.....	Jones.....	2.84	35	6.82	+3.98	7.21	1881	0.43	1872
Logan.....	Harrison.....	2.51	22	1.87	-0.64	6.60	1881	0.46	1889
Kentucky.									
Lawrence.....	Douglas.....	2.81	24	5.35	+2.54	6.96	1870	0.44	1878
Wellington.....	Sumner.....	3.46	11	2.63	-0.83	6.32	1882	1.29	1886
Louisiana.									
Grand Coteau.....	St. Landry.....	2.33	7	4.98	+2.65	4.98	1890	T.	1889
Maine.									
Orono.....	Penobscot.....	4.30	30	3.36	-0.94	7.51	1888	1.09	1882
Maryland.									
Cumberland.....	Allegany.....	2.22	19	6.65	+4.43	6.65	1890	0.00	1879
Massachusetts.									
Amherst.....	Hampshire.....	3.92	35	6.98	+3.06	11.36	1869	1.12	1876
Newburyport.....	Essex.....	3.67	12	7.20	+3.53	7.20	1850	0.81	1879
Somerset.....	Bristol.....	3.81	18	9.61	+5.80	9.61	1890	1.17	1879
Michigan.									
Kalamazoo.....	Kalamazoo.....	2.93	14	4.32	+1.39	6.57	1881	1.29	1886
Thornville.....	Lapeer.....	2.90	13	7.96	+5.06	7.96	1890	1.26	1889
Minnesota.									
Minneapolis.....	Hennepin.....	1.93	24	2.46	+0.53	4.92	1868	0.06	1889
Montana.									
Fort Shaw.....	Lewis & Clarke.....	0.51	21	2.20	+1.69	2.22	1883	0.00	1889
New Hampshire.									
Hanover.....	Grafton.....	3.42	49	4.75	+1.33	9.24	1869	0.32	1868
New Jersey.									
Moorestown.....	Burlington.....	3.29	27	5.76	+2.47	6.83	1877	0.47	1879
South Orange.....	Essex.....	3.52	30	6.98	+3.46	7.19	1877	0.27	1879
New York.									
Cooperstown.....	Otsego.....	3.29	36	5.91	+2.62	6.63	1857	0.88	1856
Palermo.....	Oswego.....	3.45	36	4.19	+0.74	7.90	1863	0.30	1882
North Carolina.									
Lenoir.....	Caldwell.....	3.40	19	4.40	+1.00	9.50	1885	0.70	1889
Ohio.									
N. Lewisburgh.....	Champaign.....	2.28	18	3.45	+1.17	5.45	1881	0.45	1887
Wauseon.....	Fulton.....	2.62	18	3.70	+1.14	8.92	1881	0.93	'74, '89

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Oct.	(2) Length of record.	(3) Total for Oct., 1890.	(4) Departure from average.	(5) Extremes for Oct.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
<i>Oregon.</i>									
Albany	Linn.....	3.64	10	1.74	-1.90	7.15	1882	0.97	1887
Eola	Polk.....	3.06	20	2.30	-0.76	8.01	1876	0.30	1874
<i>Pennsylvania.</i>									
Dyberry	Wayne	3.27	19	7.39	+4.12	7.39	1800	1.23	1882
Grampian Hills ..	Clearfield....	2.89	30	6.36	+3.47	6.36	1890	0.81	1887
Wellsborough ...	Tioga	3.57	11	4.69	+1.12	7.50	1885	0.44	1879
<i>South Carolina.</i>									
Statesburgh	Sumter.....	3.05	9	3.35	+0.30	8.15	1887	0.02	1884
<i>Tennessee.</i>									
Austin	Wilson	2.80	31	4.94	+2.14	5.11	1883	0.36	1886
<i>Texas.</i>									
New Ulm	Austin	3.83	18	3.11	-0.72	12.44	1881	0.69	1889
<i>Vermont.</i>									
Stratford	Orange	3.27	17	4.80	+1.53	6.80	1873	1.20	1882
<i>Virginia.</i>									
Birdanest	Northampton ..	3.46	21	5.80	+2.34	9.25	1872	T.	1884
<i>Washington.</i>									
Fort Townsend ..	Jefferson	3.00	14	2.07	+0.07	3.58	1875	1.00	1885
<i>Wisconsin.</i>									
Madison	Dane	2.76	21	4.59	+1.83	9.12	1881	T.	1889

* Frequently.

EXCESSIVE PRECIPITATION.

Precipitation to equal or exceed 10.00 was reported at 13 stations in Massachusetts, at 2 stations in New York and Rhode Island, and at one station in Florida, New Jersey, Michigan, and Washington; the greatest amount, 14.80, being noted at Neah Bay, Wash.

In October of preceding years monthly precipitation to equal or exceed 10.00 has been reported for 16 years in Fla.; for 11 years in Tex.; for 5 to 8 years in La., N. H., N. Y., N. C., Oregon, and Wash.; and for 1 to 4 years in Ala., Ark., Cal., Conn., D. C., Ga., Ill., Ind., Iowa, Kans., Ky., Me., Md., Mass., Mich., Miss., Mo., Ohio, Pa., R. I., S. C., Tenn., Vt., and Va. In states and territories other than those named precipitation to equal or exceed 10.00 has not been reported for October of preceding years. Among the heavier rainfalls reported for October are: 28.57, at Sims, Cal., in 1889; 20.03, at Mayport, Fla., in 1880; 29.09, at Reidsville, N. C., in 1885; and 14.80, at Ellensburg, Oregon, in 1889. Exclusive of the instances and years cited precipitation to equal or exceed 15.00 in October has been reported for 6 years in Tex.; for 4 years in Fla.; for 2 years in Ga., N. Mex., and Va.; and for 1 year in Ark., La., Me., N. H., and N. C.

Precipitation to equal or exceed 2.50 in 24 hours was reported at 12 stations in La., and on 4 dates, the 15th, 16th, 21st, and 22d; at 10 stations in S. C., and on 5 dates, the 16th, 20th to 23d; at 9 stations in Ga., and on 5 dates, the 13-14th, and 22d to 24th; at 9 stations in Tex., and on 10 dates, the 5th to 7th, 13th, and 16th to 21st; at 7 stations in N. C., and on 2 dates, the 22d and 23d; at 6 stations in Mo., and on 3 dates, the 3d, 12th, and 13th; at 6 stations in Mass., and on 5 dates, the 16th, 17th, and 23d to 25th; at 6 stations in Kans., and on 2 dates, the 12th and 13th; at 5 stations in Mich., and on 3 dates, the 12th, 13th, and 17th; at 5 stations in Iowa, and on 3 dates, the 11th to 13th; at 4 stations in Fla., and on 6 dates, the 1st, 7th to 9th, 21st, and 22d; at 4 stations in Md., and on 5 dates, the 2d, 20th, 21st, 23d, and 24th; at 3 stations in N. J., and on 4 dates, the 2d, 16th, and 23d-24th; at 3 stations in Va., and on 4 dates, the 1st, 2d, and 22-23d; at 2 stations in Ala., and on 2 dates, the 15th and 16th; at 2 stations in N. Y., and on 2 dates, the 3d and 24th; at 2 stations in Pa., and on 2 dates, the 23d and 24th; at 2 stations in R. I., and on 2 dates, the 24th and 25th; at 2 stations in Wis., and on 2 dates, the 9th and 12th; at Washington City, 22-23d; at one station in Miss., on the 16th; at one station in N. Dak., on the 13-14th; at one station in Ohio, on the 12-13th; at one station in Wash., on the 20th; and at one station in W. Va., on the 22-23d. Among the heavier rainfalls reported for this period are: 5.15 at Jacksonville, Fla., 1st;

5.15 at New Bedford (1), Mass., 23d-24th; 5.08 at Abbeville, La., 21st; 5.02 at Trial, S. C., 22-23d; 4.91 at Rio Grande City, Tex., 18-19th; 4.43 at Washington, N. C., 22-23d; 4.40 at Berlin, Mich., 13th; 4.05 at White Plains, N. Y., 3d; and 4.02 at Freehold, N. J., 23d-24th.

In October of preceding years precipitation to equal or exceed 2.50 in 24 hours has been reported for 15 years in Fla.; for 13 years in Tex. and N. C.; for 12 years in Ga. and Pa.; for 11 years in La.; for 5 to 10 years in Ala., Conn., Ill., Ind. T., Kans., Me., Md., Mass., Miss., Mo., Nebr., N. H., N. J., Ohio, N. Y., R. I., S. C., and Va.; and for 1 to 4 years in Ark., Cal., the Dakotas, D. C., Ind., Iowa, Ky., Mich., Minn., Oregon, Tenn., Utah, Vt., Wash., Wis., Del., and N. Mex. In states and territories other than those named precipitation to equal or exceed 2.50 in 24 hours has not been reported for October of preceding years. Among the heavier 24-hour rainfalls reported for October of preceding years are: 10.31, at Saint Augustine, Fla., 9-10th, 1888; 13.14, at Fernandina, Fla., 20th-21st, 1882; 9.24, at Key West, Fla., 20th-21st, 1883; 8.20, at Newport, Fla., 8th, 1876; 7.07, at Fort Robinson, Nebr., 23d, 1887; 7.77, at Galveston, Tex., 2d, 1871; and 13.08, at Brackettville, Tex., 1st-2d, 1881. Exclusive of the instances and years cited precipitation to equal or exceed 5.00 in 24 hours in October has been reported for 3 years in Fla. and Tex.; for 2 years in Ga., La., and N. C.; and for 1 year in Md., Miss., N. Y., Pa., S. C., Tenn., Va., and Wash.

Precipitation to equal or exceed 1.00 in one hour was reported at 2 stations in La., and on 2 dates, the 11th and 15th; at 2 stations in Tex., and on 2 dates, the 10th and 19th; at 2 stations in Pa., and on 2 dates, the 2d and 13th; at one station in Conn., on the 19th; at 1 station in Fla., on the 1st; at one station in Ga., on the 22d; at 1 station in Iowa, on the 12th; at 1 station in N. J., on the 2d; and at 1 station in Wis., on the 9th and 12th. Remarkably heavy rainfalls in one hour were not reported for October, 1890, and excessive rainfall for 5 and 10 minute periods are given in the table of "Maximum rainfalls in one hour, or less."

In October of preceding years precipitation to equal or exceed 1.00 in 1 hour has been reported for 8 years in Tex.; for 4 years in Iowa, Kans., Mo., and N. C.; for 3 years in D. C., Fla., Ill., and Nebr.; for 2 years in Ala., Ind., and La.; and for 1 year in Ark., Ga., Ind. T., Md., Miss., N. Y., Ohio, and S. C. In states and territories other than those named precipitation to equal or exceed 1.00 in 1 hour has not been reported for October of preceding years. Among the heavier rainfalls reported for 1 hour or less in October of preceding years are: 1.20 in 6 minutes, at Brownsville, Tex., 23d, 1884; 1.80 in 20 minutes, at Fort Scott, Kans., 2d, 1881; 1.11 in 20 minutes, at Cresco, Iowa, 10th, 1878; 2.12 in 25 minutes, at Galveston, Tex., 30th, 1877; and 2.30 in 30 minutes, at Des Moines, Iowa, 15th, 1880.

Table of excessive precipitation, October, 1890.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Alabama.</i>						
Mobile	<i>Inches.</i>	<i>Inches.</i>		<i>Inches.</i>	<i>h. m.</i>	
Mount Vernon Barracks		3.04	15-16			
<i>Alaska.</i>						
Juneau	11.31					
<i>Connecticut.</i>						
New Haven				1.18	1 00	19
<i>District of Columbia.</i>						
Washington City		3.39	22-23			
<i>Florida.</i>						
Fort Barrancas	10.46	3.89	7-8			
Do.		3.55	21-23			
Jacksonville		5.15	1			
Jupiter				1.10	1 00	1
Pensacola		3.59	8-9			
Tallahassee		3.60	22			
<i>Georgia.</i>						
Athens (1)		3.12	22-23			
Augusta		2.75	22			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Georgia—Continued.		Inches.	Inches.	Inches	h. m.	
Bainbridge			3.80		22	
Diamond			2.80	13-14		
Gainesville			3.00	22		
Milledgeville			3.55	22		
Point Peter			3.50	22		
Savannah			3.79	23-24	1.00	0 32
Thomasville (1)			3.90	22		22
Thomasville (2)			3.56	22		
Iowa.						
Eagle Grove			3.10	11		
Monticello			2.61	12		
Osage			2.57	12-13	1.58	1 10
Webster City			2.50	11		
West Bend			2.50	11-12		
Kansas.						
Elco			3.05	12-13		
Emporia			2.83	12		
Globe			3.15	12-13		
Leavenworth			2.50	12-13		
Lebo			4.16	12		
Morse			4.02	12-13		
Louisiana.						
Abbeville			5.08	21		
Baton Rouge			2.68	21		
Grand Coteau			2.59	21-22		
Houma			3.18	21		
Jackson Barracks				1.42	1 00	11
Lafayette			4.34	21		
Luling			2.50	21		
New Iberia			2.60	21		
New Orleans			2.63	15-16	1.50	1 00
Paincourtville			2.70	21-22		15
Port Eads			2.66	21-22		
Shell Beach			2.54	15		
Thibodeaux			3.61	21		
Maryland.						
Baltimore			3.04	23		
Barren Creek Springs			3.05	2		
Frederick			2.59	23-24		
Mount Saint Mary's College			2.95	20-21		
Massachusetts.						
Blue Hill (summit)			2.96	24		
Brewster			3.57	24-25		
Cotuit		10.14				
Fall River (1)		10.47				
Framingham		10.26				
Lake Cochituate		10.11				
Long Plain		10.66				
Middleborough		10.55				
Milton			3.20	24-25		
New Bedford (1)		10.01	5.15	23-24		
New Bedford (3)			4.77	24		
Princeton		10.04				
Royalston		11.62	3.00	16-17		
Somerset			4.45	23-24		
South Hingham		10.81				
Taunton (3)		10.44				
Waltham		10.48				
Westborough		10.85				
Wood's Holl			4.50	24-25		
Michigan.						
Benton Harbor			2.85	13		
Berlin		11.02	4.40	13		
Cassopolis			2.85	12		
Charlevoix			4.00	17		
Vandalia			2.79	13		
Mississippi.						
Moss Point			2.51	16		
Missouri.						
Brunswick			2.50	3		
Carrollton			3.38	12-13		
Excelsior Springs			3.20	12-13		
Kansas City			3.40	12-13		
Do			3.05	13		
Liberty			2.88	12		
New Jersey.						
Freehold			4.02	23-24		
Imlaystown			2.74	2	2.74	2 00
Oceanic		10.18	2.53	16		
New York.						
Setauket		10.20	3.16	24		
Sherman		10.19				
White Plains			4.05	3		
North Carolina.						
Chapel Hill			2.85	22		
Charlotte			2.84	22-23		
Hatteras			2.97	22-23		
Hendersonville			3.50	22-23		
Mount Holly			3.02	22-23		
Mount Pleasant			2.59	22		
Washington			4.43	22-23		
North Dakota.						
Fort Pembina			2.88	13-14		
Ohio.						
Wooster			3.82	12-13		
Pennsylvania.						
Harrisburg					1.00	1 00
Nisbet			2.80	23-24		2
Pittsburgh					1.00	1 00
Wellsborough			2.68	23		13

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall to inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
<i>Rhode Island.</i>						
Kingston (1)	Inches.	2.99	24	Inches	A. M.	
Kingston (2)	10.04					
Lonsdale	10.55					
Narragansett Pier		3.50	24-25			
<i>South Carolina.</i>						
Belmont		3.33	22			
Charleston		4.05	22-23			
Evergreen		3.25	23			
Hardeeville		2.52	22-23			
McCormick		2.98	20-21			
Port Royal		3.40	22-23			
Simpsonville		2.60	22-23			
Spartanburgh (1)		2.51	16			
Trial		5.02	22-23			
Yorkville		2.47	16			
<i>Texas.</i>						
Brazoria		2.85	20-21			
Brownsville		2.71	16-17			
Columbia		2.50	13			
Dallas (2)		2.62	21			
Edinburgh		3.90	19	2.35	1 10	19
Grapevine		4.00	20-21			
Hearne		4.80	6-7			
La Grange				1.73	0 25	10
Palestine		4.59	5-6			
Do		2.67	20-21			
Rio Grande City		4.91	18-19			
<i>Virginia.</i>						
Mossing Ford		3.00	22-23			
Petersburgh		3.22	1-2			
Richmond		2.80	1			
<i>Washington.</i>						
Neah Bay	14.80	3.30	20			
<i>West Virginia.</i>						
Harper's Ferry		3.10	22-23			
<i>Wisconsin.</i>						
Potosi		2.68	12			
Wauzeka		4.00?	9	4.00?	3 00	9
Do		4.00?	12	4.00?	4 00	12

Received too late to be used in general discussion for October, 1890.

<i>Iowa.</i>						
Sac City		2.50	10-11			
<i>Missouri.</i>						
Bradleyville				1.10	0 16	5
Kidder		2.70	12-13			
<i>North Carolina.</i>						
Clear Creek		2.75	22-23			
<i>Pennsylvania.</i>						
Carlisle		3.08	23			
<i>Texas.</i>						
Fredericksburgh		3.40	5-6			
<i>Washington.</i>						
Lapush		4.03	20-21			

Corrections: Potosi, Wis., June, 1890, day of month should be 3 instead of 2; July, 1890, page 181, strike out Potosi, Wis.

SNOW (snowfall in inches and tenths).

The first snow of the season was reported as follows: 2d, Joseph, Oregon. 3d, Henry's Lake, Idaho; Richfield, Utah. 4th, Denver, Colorado Springs, Montrose, and Smoky Hill Mine, Colo.; Cheyenne, Wyo. 5th, Mounts Thomas and Ord (about 15 miles from Fort Apache, Ariz.). 7th, Farmington, Me.; Strafford, Vt.; Kimball, Nebr. 8th, Berlin Mills, N. H.; Northfield, Vt.; Glasgow, Wis.; Hay Springs, Nebr.; Taylor's Ranch, Utah; Spokane Falls, Wash.; Lakeview and Heppner, Oregon; Walla Walla Creek, Cal. 9th, Carson City, Nev.; Beulah, Oregon. 10th, Bismarck, N. Dak. 11th, Salt Lake City and Parowan, Utah. 13th, Logansport, Ind.; Oshkosh, Wis. 14th, Fort Du Chesne and Mount Pleasant, Utah. 15th, Pueblo, Colo.; Gallatin, N. Dak. 19th, Wytheville, Va. 20th, Frederick, Md. 23d, Woodstock, Md.; Number Four, N. Y. 24th, Concord, Mass. 25th, Point Isabel, Ind.; Greenfield, Iowa; Hartland, Vt. 26th, Parkersburgh, W. Va.; Bement, Mansfield, and Wauseon, Ohio; Hendersonville and Lenoir, N. C.; Lithia Springs and Marietta, Ga.; Alpena and Manton, Mich. 27th, Binghamton and Palermo, N. Y.; Asheville, N. C.; Blue Knob, Le Roy, Wellsborough, and Pleasant Mount, Pa.; Blue Ridge Mountains (35 miles north of Lynchburgh, Va.); Greeneville, Tenn. 28th, Koepenick, Wis.; Hudson, Ypsilanti, and Port Huron, Mich.; Duluth, Minn.; New Lisbon, N. Y.; Garrettsville, Tiffin, and Westerville, Ohio;

Dyberry, Clarion, Grampian Hills, and Philipsburgh, Pa.; East Berkshire and Lunenburg, Vt. 29th, Aurora, Collinsville, Chicago, Ottawa, and Riley, Ill.; Indianapolis and Mauzy, Ind.; Amana, Larabee, and Storm Lake, Iowa; Lexington, Frankfort, Harrodsburgh, and Shelbyville, Ky.; Albion, Mottville, Thornville, Lansing, Manistee, Grand Haven, and Detroit, Mich.; Red Wing, Minneapolis, and Saint Paul, Minn.; Canton and Madison Barracks, N. Y.; Highlands, N. C.; Demos, Gratiot, North Lewisburgh, Vienna, Columbus, and Zanesville, Ohio; Flandreau, S. Dak.; Glennville, Ella, and Rowlesburgh, W. Va.; North Sutton, N. H.; Green Bay, Embarrass, and Milwaukee, Wis.; Springdale and Andersonville, Tenn. 30th, Louisville and Olney, Ill.; Vevay and Cananetown, Ind.; Independence, Iowa; Horton, Kans.; Newport Barracks, Ky.; Saint Charles, Mo.; Fremont, Crete, Tecumseh, and Weeping Water, Nebr.; East Canterbury and Antrim N. H.; Buffalo, N. Y.; Cincinnati, Cleveland, Orangeville, and Napoleon, Ohio; Pittsburgh, Altoona, and Corry, Pa.; Canton, S. Dak.; Knoxville, Jacksboro, and Rogersville, Tenn.; Oceana, Point Pleasant, Morgantown, Wheeling, and Charleston, W. Va. 31st, Baltimore, Md.; Kalamazoo, Mich.; State College, Pa.; Dale Enterprise, Va.; Louisa and Falmouth, Ky.; Vincennes, Ind.; Mount Carmel, Ill.

The greatest depth of snowfall for the month was reported at elevated stations in west-central and extreme south-central Colo., where it varied from 20.0 to 29.0. In extreme southwest Mont. over 26.0 fell; in west and northwest Mont., from 2.0 to 8.0; along the line of the Central Pacific Railroad crossing the Sierra Nevada Mountains in Cal., 2.0 to 7.0; in the northeast part of lower Idaho, 6.0 to 8.0; in central and west Nev., 2.0 to 5.0; in south-central and southeast Wyo., 3.0 to 7.0; in southwest Nebr., 5.0; in extreme northwest Minn., 8.0; in north-central upper Mich., more than 10.0; in central and southwest lower Mich., 3.0; in northeast Wis., 5.0; in extreme west N. Y., 11.0; in central N. Y., 1.0 to 3.0; in south-central west Pa., 8.0 to 11.0; in northeast W. Va., 8.0. East of the Mississippi River snow fell as far south as east Tenn.; in the Mississippi and Missouri valleys to the 40th parallel; in the Rocky Mountain and plateau regions to extreme south Colo. and Utah; and in east Cal. to about the 38th parallel.

In October, 1889, snow fell north of a line traced from extreme south N. J. westward to southeast Ohio, thence northwest to central Mich., thence southwest to north Ill., thence northward to extreme northwest Mich., thence to north N. Dak., thence southward to extreme south Kans., thence southwest to central N. Mex., thence northward to south Wyo., thence to south-central Utah, thence to east Cal. in about latitude north 38°, and east of this line continued northward over east Oregon.

Snowfall of one inch, or more, was reported as follows: *California*.—Boca, 7; Truckee, 4; Cisco, 3.5; Emigrant Gap, 2. *Colorado*.—Breckenridge, 29; Dillon, 20.8; Cumbres, 20; Climax, 18.3; Leadville, 18; Georgetown, 11.7; Como (near), 10.5; Pinkhamton, 10.1; Moraine, 7.5; Alma, 7; Stamford, 6.5; Saint Cloud, 6; Elkhorn, 5; Fort Collins, 3.2; Fort Collins (near), 3; Greenhorn, 2.5; Bennet, Husted, Magnolia, Pueblo, and Thon, 2; Delta, 1.8; Colorado Springs, 1.6; Aroya, 1.2; Eagle Farm, 1. *Idaho*.—Henry's Lake, 7.8; Era, 6.2; Beaver, 6. *Indiana*.—Point Isabel, 1.2; Columbia City, 1. *Michigan*.—Marquette, 10.9; Crystal Falls, 6.7; Vienna, 3.4; Berlin, Caldwell, Manistee, and Paw Paw, 3; Mottville, 2.5; Bellaire, 2.1; Alpena, 1.8; Birch Run, 1.6; Parkville, 1.5; Gaylord and Weldon Creek, 1.3; Gulliver Lake and Harbor Springs, 1.1; Atlantic, Berrien Springs, Calumet, Harrison, Lathrop, and Washington, 1. *Minnesota*.—Saint Vincent, 8. *Montana*.—Virginia City, 26.5; Choteau, 8; Fort Logan, 5; Helena, 2; Fort Custer, 1.3. *Nebraska*.—Kimball, 5. *Nevada*.—Austin, 5.5; Downeyville, 4.5; Hawthorne, 4; Columbus, 3; Candelaria, 2.5; Virginia City, 2.3; Pioche, 1.8; Palisade, 1. *New Hampshire*.—Berlin Mills, 3; North Sutton, 1. *New York*.—Cherry Creek, 11; Humphrey and Sherman, 6; Keene Valley, 3; Adams Centre,

Brookfield, and South Canisteo, 2; Constableville, Newark Valley, and Turin, 1. *Ohio*.—Garrettsville, Hudson, and Weymouth, 3; Vienna, 2.2; Celina, Greenville, and Orangeville, 2; Ashland, 1.9; Gratiot and Wooster, 1. *Oregon*.—Joseph, 1.8; Hardman, 1. *Pennsylvania*.—Blue Knob, 11.5; Somerset, 8.2; Eagle's Mere, 4.2; Grampian Hills, 3.5; Corry, 3; Meadville (2), 2.2; Rimersburgh, 1.8; Erie and Greenville, 1. *Tennessee*.—Springdale, 2; Greeneville, 1.1. *Utah*.—Parowan, 2.5. *Vermont*.—Strafford, 1. *Virginia*.—Bolar, 2. *West Virginia*.—Pleasant Hill, 8; Tannery, 1. *Wisconsin*.—Butternut and Koepenick, 5. *Wyoming*.—Saratoga, 7; Camp Sheridan, 6.5; Fort McKinney, 6.4; Laramie, 3.8; Camp Pilot Butte, 1.6.

DEPTH OF SNOW ON GROUND AT CLOSE OF MONTH.

On the last day of the month a depth of 7.0 was reported at Marquette, Mich.; trace to 0.3 in northeast Minn.; trace to 0.5 in east Wis.; over 1.00 in extreme north lower Mich.; trace in extreme northeast Ohio; 0.5 to 2.0 in extreme west N. Y.; 0.5 in north-central N. Y.; and 1.0 to 5.0 in the mountains of Pa.

MAXIMUM RAINFALL IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfall during October, 1890, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

Station.	Maximum fall in—					
	5 min.	Date.	10 min.	Date.	1 hour.	Date.
Bismarck, N. Dak.	Inch.		Inch.		Inch.	
Boston, Mass.	0.17	4	0.22	4	0.45	12
Buffalo, N. Y.	0.05	14	0.10	14	0.23	14
Cincinnati, Ohio	0.10	4	0.15	4	0.39	4
Chicago, Ill.	0.06	6	0.11	6	0.50	6
Cleveland, Ohio	0.30	13	0.40	13	0.55	13
Denver, Colo.	0.20	13	0.27	13	0.39	13
Detroit, Mich.	0.20	13	0.30	12	0.52	12
Dodge City, Kans.	0.25	12	0.17	13	0.35	13
Duluth, Minn.	0.08	13	*	13	0.10	20
Eastport, Me.	0.30	20	0.45	20	0.95	20
Galveston, Tex.	0.30	1	0.59	1	1.00	1
Jupiter, Fla.	0.30	10	0.45	10	0.55	10
Key West, Fla.	0.30	10	0.45	10	0.55	10
Marquette, Mich.	0.05	22	0.05	6	0.25	22
Memphis, Tenn.	0.06	17	0.12	17	0.43	16
New York City	0.30	15	0.45	15	1.30	15
New Orleans, La.	0.16	23	0.19	23	0.30	23
Norfolk, Va.	0.03	6	0.05	6	0.23	6
Philadelphia, Pa.	0.06	16	0.12	16	0.75	16
Philadelphia Water Works	0.05	16	0.05	16	0.15	16
Portland, Oregon	0.15	12	0.20	12	0.43	12
Saint Louis, Mo.	0.06	22	0.06	22	1.00	22
Saint Paul, Minn.	0.05	23	0.08	23	0.40	23
San Diego, Cal.	0.06	10	0.09	10	0.23	10
San Francisco, Cal.	0.35	22	0.60	22	1.00	22
Santa Fe, N. Mex.	0.05	23	0.08	23	0.40	23
Savannah, Ga.	0.20	16	0.35	16	0.45	16
Washington City	0.05	23	0.08	23	0.40	23
Wilmington, N. C.	0.20	16	0.35	16	0.45	16

*Not sufficient to register. †No record on account of snow. ‡Less than .05 in 1 hour.

HAIL.

Description of the more severe hail storms of the month is given under "Local storms." Hail was reported as follows: 1st, Ariz., Colo., Wash. 3d, Kans., Utah. 4th, Ind. 6th, Ariz., Iowa. 8th, Colo. 9th, Iowa. 10th, Ariz., Iowa, Kans., Nev. 11th, S. Dak., Utah. 12th, Ill., Iowa, Kans. 13th, Ill. 14th, Mich., N. Y., Ohio, Oregon, Pa. 16th, Oregon, S. C. 17th, Mich., N. Y. 18th, Mich., Ohio, Oregon. 19th, Conn., Mich., N. J., N. Y., Pa. 21st, Ind. T. 23d, Pa. 25th, Ill., Ind., Tenn. 26th, Ga., Ky., Mich., N. C., Ohio, Pa., Va. 27th, Ky., N. C. 28th, Ind., Mich., Ohio, Wis. 29th, Ill., Ky., Mass., Mich., N. J., N. Y., N. C., Ohio, Pa., Wis. 30th, Ind., Mich., N. J., N. Y., Ohio, Pa., Tenn. 31st, N. Y.

SLEET.

Sleet was reported as follows: 2d, Utah. 11th, Ariz., Nev. 13th, Minn. 14th, Minn., Wis. 15th, Pa. 16th, Minn. 18th, Wis. 23d, Conn., Md., N. Y. 24th, Mass. 25th, Ind., Minn. 26th, Ga., Ind., Mich., Pa., Tenn., W. Va. 27th, N. Y., Ohio. 28th, Mich., Minn., N. Y., Vt. 29th, Ill., Iowa, Mich., N. Y., Ohio, Pa. 30th, Mich., Ohio, Tenn. 31st, Ill., N. Y., Ohio, Wis.

WINDS.

The prevailing winds during October, 1890, are shown on chart II by arrows flying with the wind. In New England and the north part of Florida the winds were generally from north-west to northeast; in the middle Atlantic states and on the south Pacific coast from west to northwest; in the south Atlantic states, the Ohio Valley and Tennessee, the lower lake region, in the upper Mississippi valley, on the northeast slope of the Rocky Mountains, and over the middle plateau region from southwest to northwest; over south Florida from south to east; in the east Gulf states, the upper lake region, and on the middle Pacific coast from west to north; in the west Gulf states and the lower Rio Grande valley from northeast to southeast; in the extreme northwest from the northwest; in the Missouri Valley from southeast to south; on the southeast slope of the Rocky Mountains from south to southwest; over the northern plateau region from southeast to southwest; on the north Pacific coast from south to west; and on the middle-eastern slope of the Rocky Mountains and over the southern plateau region, variable.

HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Signal Service, as follows: 1st, 67, sw., at Fort Canby, Wash. 4th, 52, w., at Bismarek, N. Dak.; 6th, 60, w., at Fort Buford, N. Dak. 6th, 60, w., at Fort Canby, Wash. 13th, 50, sw., at Chicago, Ill. 17th, 60, nw., at Wood's Holl., Mass.; 54, se., at Block Island, R. I.; 52, nw., at Atlantic City, N. J. 18th, 52, n., at Grand Haven, Mich.; 72, se., at Fort Canby, Wash. 19th, 54, ne., at Boston, Mass. 24th, 54, ne., at Nantucket, Mass.; 78, ne., at Block Island, R. I. 25th, 72, e., at Block Island, R. I. 27th, 54, ne., at Nantucket, Mass.

LOCAL STORMS.

4th.—Heavy showers of rain, with thunder and lightning, occurred at Yuma, Ariz., in the early morning. Bridges were carried away, washouts occurred on the railroad, and telegraph lines were prostrated. The greatest damage was reported about 20 miles east of Yuma. At Fort Buford, N. Dak., a heavy gale from the west began at midnight and continued until 9.35 p. m., the wind attaining a maximum velocity of 60 miles per hour. Fences and outhouses were blown down. 5-6th.—Heavy north and northeast gales and snow storms prevailed over the Gulf of Saint Lawrence. 11th.—A heavy thunder-storm passed over Stilson, Iowa, at 9 p. m. A barn was struck by lightning and 3 horses killed. 12th.—During a thunder-storm high wind injured houses, uprooted trees, etc., at Heaton, Ind. T. At Berlin, Tex., 2 head of cattle were struck by lightning and killed during a thunder-storm. A severe wind storm, with lightning, occurred at Corsicana, Tex., in the evening. Several houses were blown down and trees were uprooted. A heavy hail storm was reported in the southern part of Webster Co., Iowa, the morning of the 12th. A severe rain storm, with thunder and lightning, was reported at Bellaire, Ohio, in the early morning. Streams rose rapidly, overflowing lowlands and causing washouts on railroads. Heavy rain swelled streams in north West Virginia, causing great damage to railroads, bridges, etc. 12-13th.—Heavy rain, with thunder and lightning, began at Lebo, Kans., at 2.15 p. m., 12th, and ended 6.10 a. m., 13th, during which time 5.00 inches fell. Lebo Creek overflowed its banks, causing damage to wheat fields. A heavy gale prevailed over Lake Superior. 13th.—A heavy gale prevailed over the upper lakes. The barge "Warren" was wrecked at Alpena, Mich. Hard gales also prevailed on Lake Erie. A violent wind and rain storm began at Conway, Ark., at 4 a. m. and continued about 30 minutes, damaging trees and fences. A severe storm visited Andale, Kans., in the afternoon, doing damage to small buildings, etc. A severe rain storm caused damage to crops and railroad property along the Monongahela and Little Kanawha rivers and tributaries in West Virginia. 13-14th.—

High winds, heavy seas, and disasters were reported on the upper lakes. 14th.—Numerous disasters to shipping reported on the upper lakes. At Port Arthur, Ont., the machinery and material for the new breakwater were washed away. 15th.—In the afternoon heavy rain flooded streets and suspended street traffic at New Orleans, La.

16th.—A moderate thunder-storm moved southeast over Wilmington, N. C. Several local storms were reported within a radius of 100 miles of Wilmington, N. C. One appears to have originated about noon about 10 miles southwest of Cheraw, S. C., and moved from sw. to ne., cutting a path for a few miles through the forest. Another was reported, about 2 p. m., a few miles south of Hamlet, N. C., and moved from sw. to ne. a distance of about 2 miles, with but slight damage. Another, the most destructive, seems to have started a few miles south of Hasty, N. C., and moved from sw. to ne., passing south of Hasty and nw. of Maxton, N. C., and ending a few miles ne. of Floral College, N. C., the track being about 20 miles in length, and following the general direction of the Cape Fear and Yadkin Valley Railroad, with a slight deflection to the northwestward where it crossed the Lumber River. This storm was attended by heavy rain and electrical discharges which preceded the passage of a funnel-shaped cloud. The funnel seemed to whirl from south to east, or from left to right, and during its passage trees were torn up, houses demolished, one person killed, and several seriously injured. The damage to houses, all of which were small, was estimated at \$1,000, and to crops \$1,000. The storm was attended by a roaring sound, and the width of the path at the place of greatest destruction, near Hasty, was 60 feet, but trees were torn down a distance of 100 yards on either side and fell towards the track. This storm appeared to be a well-defined tornado, and the small loss of life and property was due to the very thinly settled country through which it passed.

17th.—A violent storm caused much damage to shipping along the New England, New York, and New Jersey coasts. At New York City high northerly winds and high tides prevailed. A tug boat was sunk by collision due to wind and tide off the Battery and two lives lost. At Block Island, R. I., the storm commenced 1.40 a. m., and the wind attained a velocity of 54 miles per hour from the southeast, causing damage to marine and other interests in that section. A severe gale prevailed at Buffalo, N. Y., attaining a velocity of 48 miles per hour. Lake Erie was very rough, and the inner breakwater at Buffalo was submerged. 18th.—A heavy gale prevailed on Lake Michigan.

19th.—A heavy rain storm passed over New Haven, Conn., about 3.15 p. m. Lightning struck the tower of the Public Library Building, carrying off pieces of slating and doing other minor damage. Lightning also struck in two other places in the vicinity of the library building, and caused damage to telegraph and telephone wires. In the centre of the city basements and cellars were flooded and sewers overflowed. At New London, Conn., high wind prevailed in the morning, and a very high sea was running from east to southeast. Considerable damage was also reported in other Connecticut towns by lightning and rain. The storm was quite severe in southeast New York, and a number of wrecks were reported in Massachusetts Bay. 22d.—A severe storm swept over Gilmer, Fannin, Lumpkin, Pickens, and Dawson counties, Ga., causing considerable damage in the mountain forests. A heavy rain and wind storm occurred at Mount Alta, W. Va. Small mountain streams were swelled and carried away fences, damaged bridges, etc. 22-23d.—A northeast gale and heavy rain prevailed at Mossing Ford, Va. 23d.—A severe storm, with lightning and heavy rain, prevailed at Tampa, Fla., in the early morning. A lumber and saw mill was struck by lightning and burned; damage, \$30,000. Heavy northeasterly gales prevailed over Chesapeake Bay and along the middle Atlantic coast, causing considerable damage on land and sea,

and delaying vessels. 24th.—High seas and heavy gales caused great damage along the middle Atlantic coast. During a heavy storm with high northwest wind, a small vessel was blown ashore on Long Island Sound, a steam yacht was wrecked, and considerable damage was done along the Long Island coast and on the Sound. At Block Island, R. I., the wind reached a velocity of 78 miles per hour at 9.08 p. m. No vessels left the harbor; several broke from their moorings, and two sunk. At Boston, Mass., the wind reached a velocity of 48 miles per hour from the northeast, with heavy seas, and considerable damage was done to shipping, wharfage, and seaside property in that section. 24–25th.—A northeast gale, with rain, commenced at Vineyard Haven, Mass., the night of the 24th and continued until 11 a. m., 25th, causing damage to hotel property, washing away bathing houses, and prostrating the telegraph line. The approach to the gauges and anemometer of the Signal Office was torn away. 26th.—A heavy wind and thunder-storm occurred at Cape Henry, Va., in the afternoon. At Cleveland, Ohio, high wind, with rain and small hail, prevailed. A loaded lumber barge was wrecked on the breakwater; one of the crew was drowned. 29th.—High wind, with rain and small hail, prevailed at Cleveland, Ohio, during the evening. A schooner went ashore inside the west breakwater.

WATER-SPOUTS.

Four water-spouts were observed 6 miles wnw. from Key West, Fla., between 5.20 and 5.45 p. m., 2d. One spout continued about 20 minutes. Another, somewhat larger, developed at 5.35 p. m., and, although it extended but half-way down, churned the water beneath it to a considerable height. Down the centre of these spouts a light or transparent core was observed. The other two spouts were in the first stages of formation, and were consequently very small. One ex-

tended from the base of the cloud towards the southwest at an angle of 45°, and the other curved towards the northeast at an angle of 35°. On the 19th, at 3.30 p. m., a water-spout formed during a storm near the new light-house, 5 miles from New Haven, Conn., and moved rapidly westward along Long Island Sound. It then moved eastward. A water-spout was seen later at Milford, about 10 miles distant. It was a huge black mass 200 to 400 feet in height and about 25 feet in diameter. As it moved westward it diminished in diameter. The gyration of the spout was very rapid, and the water in its vicinity was greatly agitated. Three water-spouts were observed moving from west to east two miles south of Hatteras, N. C., at 2.20 p. m. of the 26th. One extended from cloud to sea, and was complete, and the others were only partly formed and hung downward from the clouds.

Storms at Palmetto, Nev., August 7 and 11, 1890.

On the 11th two intensely black thunder clouds appeared over the crests of the surrounding mountains, one approaching from the north, and the other from the east. A short distance from Palmetto these clouds seemed to join, and rushed with extraordinary swiftness towards Palmetto. The resultant cloud was riven with lightning, and the air became filled with a terrific roar above which the thunder was hardly audible. A column of water poured down, excavating a trench about 500 feet long, and, in places, 7 feet deep and 20 feet in width. Within 10 minutes the entire lower part of the Palmetto Valley was 2 to 3 inches under water, and the cañon leading to Fish Lake Valley was a torrent. The stage road was obliterated for 9 miles, although the rainfall extended but little beyond Palmetto.

The storm of the 7th was very similar to that of the 11th, except that the rain seemed to come from one cloud, only. This cloud appeared to touch the ground and roll down the mountain side, and the rain covered a greater area.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 1st, Mount Saint Mary's, Md.; Wilkes Barre, Pa. 4th, New Haven, Mo. 5th, New Hartford and Southington, Conn.; Eastport and Orono, Me.; Cambridge, Fall River, and Newburyport, Mass.; Berlin Mills, Hanover, Manchester, and Nashua, N. H.; Madison, N. J.; Lowville and New Lisbon, N. Y.; Eagle's Mere, Pa.; Flandreau and Wolsey, S. Dak.; Hartland, Vt. 8th, Tatoosh Island, Wash. 9th, Wolsey, S. Dak. 10th, Mount Saint Mary's, Md. 13th, Eastport, Kent's Hill, and Orono, Me. 14th, Glendive, Mont. 16th, Seymour, Ind. 17th, New Hartford, Conn.; Lacon, Lincoln, Louisville, Riley, and Rushville, Ill.; Angola and Seymour, Ind.; Afton, Alta, Amana, Bancroft, Cresco, and McCausland, Iowa; Barren Creek Springs, Md.; Amherst, Royalston, and Somerset, Mass.; Alpena, Detroit, Lausling, Manton, Marquette, Sault de Ste. Marie, and Thorndale, Mich.; Glendive, Mont.; Nashua, N. H.; Beverly, Egg Harbor City, Madison, Moorestown, and Rancocas, N. J.; Buffalo, Ithaca, Lowville, New Lisbon, and Oswego, N. Y.; Fort Buford, N. Dak.; Bangorville, Bement, Lordstown, and North Lewisburgh, Ohio; Erie, Coatesville, Grampian Hills, Eagle's Mere, Le Roy, and Nisbet, Pa.; Block Island, R. I.; Rapid City, S. Dak.; Embarrass, Wis. 18th, Grampian Hills, Pa.; Rapid City, S. Dak. 20th, Mount Saint Mary's, Md. 21st, Mount Saint Mary's, Md.; Milwaukee, Wis. 26th, Huron, S. Dak. 27th and 29th, Grinnell, Iowa. 30th, Mount Saint Mary's, Md.; Palestine, Tex. 31st, Grinnell, Iowa; Mount Saint Mary's, Md.

On the 17th auroras were observed from New England to the Dakotas and southward to Maryland and the Ohio Valley. The following are among the more notable displays reported:

Manchester, N. H., 5th: a diffused auroral light resembling

the dawn of day was observed in the north from 7.30 to 9.30 p. m. Its color was a very light yellow tinged with crimson, and it rose to altitude 30° and extended from azimuth 145° to 220°.

Buffalo, N. Y., 17th: a faint auroral arch was observed from 8.20 to 8.50 p. m., being brightest about 8.40 p. m. The arch extended from 20° east of north to 15° west of north, and the elevation of the centre when the display was most brilliant was 25°. The arch broke in the centre at 8.43 p. m., and disappeared rapidly.

Sault de Ste. Marie, Mich., 17th: an aurora consisting of a well-defined arch of a light gray color, extending from 200° to 280° of azimuth and to 20° altitude was observed above a dark segment; a few streamers shot up to altitude 40°. The maximum brilliancy was about 2 a. m., 18th, and the display disappeared about 4 a. m., 18th.

Marquette, Mich., 17th: an aurora in the shape of a double arch of diffused white light was observed at 7.30 p. m. One arch extended from azimuth 130° to 225°, and the other from east to west-northwest, cutting the zenith. The display lasted until midnight.

Fort Buford, N. Dak., 17th: an aurora, consisting of a gray line, of irregular form, extending between northwest and northeast and to altitude about 20°, was observed at 8.55 p. m. Two streamers of a reddish tinge were observed, one near the centre, and the other near the eastern end of the display, which remained without material changes until 9.28 p. m. The aurora continued until 10.40 p. m., when it had entirely disappeared. The display was not clearly visible, as the northern horizon was partly obscured by clouds.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." East of the Rocky Mountains thunder-

storms were reported in the greatest number of states, 16, on the 12th and 13th; in 10 to 15 on the 1st to 6th, 11th, 12th, 16th, 18th, and 19th; and in 1 to 9 on the 7th, 8th, 9th, 15th, 17th, 20th to 27th, 29th, and 30th. The 28th and 31st were the only dates on which no thunder-storms were reported.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 16, in Iowa, and Mo.; on 10 to 15 in Ark., Fla., Ill., Kans., La., Mich., Ohio, and Tex.;

and on 1 to 9 in Ala., Conn., Ga., Ind., Ind. T., Ky., Me., Md., Mass., Minn., Miss., Mont., Nebr., N. H., N. J., N. Y., N. C., N. Dak., Pa., R. I., S. C., S. Dak., Tenn., Vt., Va., W. Va., and Wis. West of the Rocky Mountains thunder-storms were reported as follows: Ariz., 1st to 4th, and 10th; Colo., 1st, 11th, and 20th; Nev., 10th; N. Mex., 1st; Utah, 2d, 7th, and 11th; Wash., 16th; Wyo., 1st. No thunder-storms were reported in Cal., Del., D. C., Idaho, and Oregon.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-point at the several stations; the highest and lowest water during October, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, October, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River.</i>						
Shreveport, La.	29.9	25, 26	7.3	13	5.5	1.8
<i>Arkansas River.</i>						
Fort Smith, Ark.	22.0	25	11.2	6	4.2	7.0
Little Rock, Ark.	23.0	27	12.4	8	7.8	4.6
<i>Missouri River.</i>						
Fort Buford, N. Dak.		10, 11	1.5	30, 31	0.4	1.1
Sioux City, Iowa.		2	4.5	20	3.6	0.9
Kansas City, Mo.	21.0	16	4.5	30, 31	3.1	1.4
<i>Mississippi River.</i>						
Saint Paul, Minn.	14.5	20 to 22	2.6	6	1.6	1.0
La Crosse, Wis.	13.0	20	6.3	9, 10, 11	3.4	2.9
Dubuque, Iowa.	16.0	25	7.6	10, 11	3.9	3.7
Davenport, Iowa.	15.0	20 to 28	4.9	12, 13	2.3	2.6
Keokuk, Iowa.	14.0	29, 30	4.8	14, 15	2.2	2.6
Saint Louis, Mo.	32.0	22	9.4	17	6.7	2.7
Cairo, Ill.	40.0	31	18.1	20	11.4	6.7
Memphis, Tenn.	34.6	1	14.6	22	8.8	5.8
Vicksburg, Miss.	41.0	2	22.9	26	13.0	9.9
New Orleans, La.	13.0	6	6.4	28, 29	4.2	2.2
<i>Ohio River.</i>						
Pittsburgh, Pa.	22.0	25	16.2	1	4.8	11.4
Parkersburg, W. Va.	38.0	27	23.2	4	6.9	16.3
Cincinnati, Ohio.	50.0	30	32.9	1	12.0	20.9
Louisville, Ky.	25.0	30	12.2	1, 2	6.3	5.9
<i>Cumberland River.</i>						
Nashville, Tenn.	40.0	4	11.4	22	3.3	8.1
<i>Tennessee River.</i>						
Chattanooga, Tenn.	33.0	27	9.5	16, 17, 18	3.7	5.8
<i>Monongahela River.</i>						
Pittsburgh, Pa.	29.0	25	16.2	1	4.8	11.4

Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Savannah River.</i>						
Augusta, Ga.	32.0	1	28.5	16	7.1	21.4
<i>Willamette River.</i>						
Portland, Oregon.	15.0	2	2.7	8	0.2	2.5

FLOODS.

Reports of the 12th show that great damage was caused to crops, railroad, and other property in West Virginia by freshets in the Monongahela and Little Kanawha rivers and tributaries. At Glenville, W. Va., the Little Kanawha had risen 25 feet by the 13th, washing away large quantities of hay, corn, and lumber. At Parkersburg, W. Va., the Ohio River rose 11 feet from the 13th to 15th, on which latter date it stood 21.1 feet on the gauge. The Connecticut River was unusually high on the 21st. The Roanoke River was rising rapidly at Weldon, N. C., on the 23d; on the 25th the water covered low ground; and on the 26th the water began to recede. A freshet was reported on the 26th in the Wyoming Valley, in the Susquehanna River basin, Pa. On the 29th high winds, together with a freshet, caused the Cape Fear River to flood its banks near Wilmington, N. C., inundating rice fields, sweeping away rice stacked in the fields, and flooding lower floors of stores on Water street in Wilmington. At Mossing Ford, Va., the excessive precipitation of the month caused the overflow of small streams.

MISCELLANEOUS PHENOMENA.

SUN SPOTS.

Haverford College Observatory, Pa., (observed by Prof. F. P. Leavenworth):

Date.	Number of new		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		Faculae.	Remarks.
	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.	Groups.	Spots.		
Oct., 1890.										
1, 9 a. m.	0	0	0	0	0	0	1	28	0	Definition fair; spots small.
3, 11 a. m.	0	0	0	0	0	0	0	0	2	Definition fair.
4, 10 a. m.	1	2	0	0	0	0	1	2	5	Definition good.
5, 3 p. m.	1	12	0	0	0	0	2	14	4	Definition good; spots small.
8, 9 a. m.	0	0	0	0	0	0	1	1	2	Definition good; spots small.
10, 11 a. m.	1	1	0	0	0	0	1	1	2	Definition fair.
11, 10 a. m.	1	4	0	0	0	0	2	8	2	Definition fair.
14, 4 p. m.	0	0	0	0	0	0	1	3	1	Definition poor.
15, 10 a. m.	0	0	0	0	0	0	0	0	2	Definition poor.
17, 9 a. m.	0	0	0	0	0	0	0	0	2	Definition fair.
18, 10 a. m.	0	0	0	0	0	0	0	0	1	Definition good.
25, 10 a. m.	1	50	0	0	0	0	1	50	...	Definition partial through clouds.
26, 9 a. m.	0	0	0	0	0	0	1	40	1	Definition poor; large double spot.
27, 2 p. m.	0	0	0	0	0	0	1	24	0	Definition fair.
28, 9 a. m.	0	0	0	0	0	0	1	8	2	Definition poor.
29, 2 p. m.	0	0	0	0	0	0	1	16	3	Definition poor.
30, 10 a. m.	0	0	0	0	0	0	1	3	3	Definition fair.
31, 10 a. m.	0	0	0	0	0	0	1	4	3	Definition fair.

Mr. D. E. Hadden, Alta, Iowa: 1st, 1 group, 2 spots; small faculae nw. 2d, faculae on nw. limb. 6th, 1 group. 14th, faculae near w. limb. 16th to 18th, clear disc. 19th, 1 group, 3 spots on se. limb, with faculae. 20th, 1 group, 6 spots; 3 new spots, and group of faculae on e. limb. 21st, 1 group, 6 spots, 3 spots large, with faculae surrounding. 22d, 2 groups, 11 spots. 23d, 2 groups, 17 spots; 1 spot large, and the others small. 24th, 2 groups, 15 spots. 25th, 1 group, observation incomplete, clouds. 26th 1 group, 1 large spot; could not count spots, hazy. 30th, 1 group, 2 spots; faculae in nw. 30th, 1 spot disappearing by rotation on w. limb; hazy. Cloudy on 3d, 5th, 8th, 13th, 15th, 27th to 29th.

Mr. John W. James, Riley, Ill.: 1st, one new group near west edge. 3d, no spots seen, but broad areas of faculae on west limb. 7th to 17th, observations on 7 days but no spots seen. 19th, faculae on east edge, followed on 20th by a fine large group, estimated 52,600 miles long, one large spot 26,300 miles diameter, and about 20 small spots. 24th, a new group southeast of large spot. 27th, all the small spots gone; faculae in their place; the large spot, still intact, disappeared by solar rotation November 1st.

Mr. C. E. Buzzell, Leaf River, Ill.: 6th and 7th, small group in south latitude. 14th, small spot in south latitude near meridian. 19th, large group at east limb which completed the transit. Observations not taken on many dates on account of clouds.

Mr. H. D. Govey, North Lewisburgh, Ohio: sun spots were observed on the 20th, 21st, and 24th.

DROUGHT.

At Minden, Nebr., the month was very dry; no fall plowing was done; and pastures were injured. At Howe, Nebr., no rain fell after the 15th, and wells were failing. Drought prevailed at Concordia, Kans.; many wells were dry and water was scarce. At Hannibal, Mo., no rain fell after the 15th; water for stock was scarce and wheat suffered by drought. At Pickering, Mo., the month was dry; streams were very low; water for stock scarce, and the ground too dry to plow. At Woonsocket, S. Dak., the drought continued during the month, and very little plowing was done. A report from Marshall, Minn., dated the 1st, stated that Island Lake, Goose Lake, and Lake Stay were dry.

PRAIRIE AND FOREST FIRES.

On the 2d extensive prairie fires were reported near New

England City, N. Dak., and north and east of Bismarek, N. Dak. Prairie fires were reported south and west of Bismarek on the 4th. On the 9th prairie fires occurred at Cannon Ball, N. Dak. Destructive prairie fires were reported along the Cannon Ball, Knife, and Heart Rivers, N. Dak., during the first half of the month. Reports of the 21st from Los Angeles, Cal., state that extensive mountain fires prevailed near the Santa Monica Cañon, and grass fires on the plains, causing considerable damage. A report from San Diego, Cal., dated the 22d, states that brush fires prevailed, with hot, dry winds from the n. and nw., badly drying and burning raisin grapes. On the 2d timber fires had caused great damage near Rapid City, S. Dak.; several ranches were burned, and many telegraph poles were destroyed. On the 3d snow and rain nearly extinguished the fires. Destructive fires were also reported in the region of Rapid City on the 5th and 31st. Forest fires were reported near Red Bluff, Cal., on the 9th, 10th, 11th, 15th, and 25th to 31st.

VERIFICATIONS.

[Verifications made by Assistant Professor C. F. Marvin, assisted by Mr. H. E. Williams, chief clerk of the Forecast-Division.]

FORECASTS FOR 24 HOURS IN ADVANCE.

The forecasts for districts east of the Rocky Mountains for October, 1890, were made by 2d Lieut. W. A. Glassford, Signal Corps, and those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant John P. Finley, Signal Corps.

Percentages of forecasts verified, October, 1890.

States.		States.	
Maine.....	80.3	Kentucky.....	85.7
New Hampshire.....	73.2	Ohio.....	84.8
Vermont.....	75.0	West Virginia.....	86.4
Massachusetts.....	76.3	Indiana.....	82.6
Rhode Island.....	86.8	Illinois.....	81.0
Connecticut.....	82.1	Lower Michigan.....	78.9
Eastern New York.....	84.3	Upper Michigan.....	76.4
Western New York.....	84.1	Wisconsin.....	75.4
Eastern Pennsylvania.....	86.8	Minnesota.....	77.7
Western Pennsylvania.....	79.3	Iowa.....	75.2
New Jersey.....	87.1	Kansas.....	83.1
Delaware.....	84.3	Nebraska.....	86.3
Maryland.....	86.6	Missouri.....	77.7
District of Columbia.....	88.3	Colorado.....	83.0
Virginia.....	84.0	North Dakota.....	78.7
North Carolina.....	84.3	South Dakota.....	83.2
South Carolina.....	92.7	Southern California*.....	91.8
Georgia.....	92.8	Northern California*.....	87.8
Eastern Florida.....	90.6	Oregon*.....	83.2
Western Florida.....	92.1	Washington*.....	80.9
Alabama.....	91.4	By elements: Weather.....	88.5
Mississippi.....	91.0	Temperature†.....	77.1
Louisiana.....	90.8	Monthly percentage of weather and temperature combined‡.....	83.9
Texas.....	85.9		
Arkansas.....	85.9		
Tennessee.....	87.0		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The forecasts of temperature in districts east of the Rocky Mountains for October, 1890, were made with reference to the maximum temperature alone; that is, a prediction of warmer or cooler indicated that the maximum temperature of the day designated would be higher or lower than the maximum of the previous day. ‡ The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

FORECASTS FOR 48 HOURS IN ADVANCE.

Appreciating the great importance that long time predic-

tions possess for the general public the Chief Signal Officer has authorized forecasts for 48 and 72 hours, covering the 2d and 3d days in advance. These are optional with the forecast official, and are only made when clearly in the public interest, and cover, in all cases, considerable areas of country, and are not confined to localities.

Percentages of verifications of forecasts made for second day in advance. Number of predictions made: weather, 11; temperature, 3. Percentages of verifications: weather, 60.0; temperature, 83.3; weather and temperature combined, 63.6. No forecasts for 72 hours were made during the month.

CAUTIONARY SIGNALS FOR OCTOBER, 1890.

Statement showing percentages of justifications of wind signals for the month of October, 1890:

Wind signals.—(Ordered by 2d Lieut. W. A. Glassford). Total number of signals ordered, 121; justified as to velocity, wholly, 79, partly, 9; justified as to direction, 112. Of the signals ordered 88 were cautionary, of which 54 were wholly, and 6 partly justified; and 33 were storm signals, of which 25 were wholly, and 3 partly justified. 48 signals were ordered for easterly winds, of which 42 were justified, and 73 were ordered for westerly winds, of which 70 were justified. Percentage of justifications, 71.7.

No cold-wave signals were ordered during the month.

Percentages of verifications of weather and temperature signals reported by directors of the various State Weather Services for October, 1890.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Iowa.....	86	88	Nebraska.....	84	84
Illinois.....	75	71	New Jersey.....	83	88
Kansas.....	83	90	North and South Dakota....	68	84
Michigan.....	82	87	Ohio.....	82	89
Minnesota.....	70	83	Pennsylvania.....	78	87
Missouri.....	79	84	South Carolina.....	80	90

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts and summaries are republished from reports for October, 1890, of the directors of the various state weather services:

ARKANSAS.

Temperature.—The mean was 1.7 below the normal; maximum, 91, at Lead Hill, 12th; minimum, 26, at Devall's Bluff and Stuttgart, 31st; greatest monthly range, 61, at Lead Hill; least monthly range, 32, at Malvern.

Precipitation.—The average was 1.00 above the normal of the last 8 years;

greatest monthly, 4.46, at Camden; least monthly, 1.46, at Pine Bluff.—*M. F. Locke, Commissioner of Agriculture, Little Rock, director; F. H. Clarke, Sergeant, Signal Corps, assistant.*

ALABAMA.

Temperature.—The mean was 2.5 below the normal; maximum, 93, at

Citronelle, 4th and 5th; minimum, 28, at Valley Head, 31st; greatest monthly range, 57, at Valley Head.

Precipitation.—The average was 1.54 above the normal; greatest monthly, 7.33, at Opelika; least monthly, 1.90, at Fort Deposit.

Wind.—Prevailing direction, northwest.—*Prof. P. H. Mell, Auburn, director; J. M. Quarles, Private, Signal Corps, assistant.*

COLORADO.

Temperature.—The mean corresponded with the normal of the last 5 years; maximum, 93, at Sterling, 19th; minimum, —10, at Breckenridge, 23d; greatest monthly range, 95, at Breckenridge; least monthly range, 30, at Byers.

Precipitation.—The average was somewhat below the normal of the last 5 years; greatest monthly, 3.26, at Cumbres; least monthly, 0.00, at several stations.

Wind.—Prevailing direction, west.—*W. S. Miller, Sergeant, Signal Corps, Colorado Springs, assistant.*

ILLINOIS.

Temperature.—The mean was 1.0 below the normal of the last 15 years; maximum, 94, at East Peoria, 12th; minimum, 20, at Atwood and Sandwich, 31st.

Precipitation.—The average was 0.26 below the normal of the last 12 years; greatest monthly, 6.40, at Winnebago; least monthly, 0.60, at Irishtown.

Wind.—Prevailing direction, northwest.—*John Craig, Sergeant, Signal Corps, Springfield, in charge.*

INDIANA.

Temperature.—Maximum, 85, at Huntingburgh, Princeton, Marengo, Vevay, and Seymour, 12th; minimum, 20, at Point Isabel, 31st; greatest monthly range, 58, at Point Isabel; least monthly range, 42, at Angola.

Precipitation.—Greatest monthly, 4.60, at Marengo; least monthly, 2.05, at Muncie.

Wind.—Prevailing direction, northwest.—*Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.*

IOWA WEATHER AND CROP SERVICE.

Temperature.—The mean was slightly below the normal; maximum, 86, at Keokuk, 12th; minimum, 16, at Cresco and Webster City, 31st; greatest monthly range, 64, at Keokuk; least monthly range, 47, at Iowa City.

Precipitation.—Greatest monthly, 6.82, at Monticello; least monthly, 1.09, at Omaha, Nebr.

Wind.—Prevailing direction, northwest.—*J. R. Sage, Des Moines, director; G. M. Chappel, Sergeant, Signal Corps, assistant.*

KANSAS.

Temperature.—The mean was 1.0 above the normal; maximum, 91, at Sedan, 10th; minimum, 9, at Lakin, 16th; greatest monthly range, 77, at Lakin; least monthly range, 50, at Leavenworth, Weskan, and Winona.

Precipitation.—The average was 0.52 above the normal; greatest monthly, 6.98, at Lebo; least monthly, 0.00, at Ellis.

Wind.—Prevailing direction, south.—*Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant, Signal Corps, assistant.*

KENTUCKY.

Temperature.—The mean was slightly below the normal; maximum, 87, at Frankfort, 12th; minimum, 23, at Princeton, 31st; greatest monthly range, 63, at Princeton; least monthly range, 44, at Caddo.

Precipitation.—The average was nearly normal; greatest monthly, 5.17, at Edmonton; least monthly, 2.00, at Earlington.

Wind.—Prevailing direction, southwest.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

LOUISIANA.

Temperature.—The mean was slightly above the normal for the first half of the month and below for the latter half; maximum, 94, at Cameron, 5th and 12th; minimum, 33, at Davis, 26th; greatest monthly range, 58, at State Experiment Station; least monthly range, 38, at New Orleans.

Precipitation.—Greatest monthly, 8.04, at Abbeville; least monthly, 2.90, at Homer.

Wind.—Prevailing direction, north.—*George E. Hunt, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

Temperature.—The mean was 0.6 below the normal of the last 15 years; maximum, 82, at Clinton and Adrian, 13th; minimum, 21, at Roscommon, 22d; greatest monthly range, 60, at Otsego; least monthly range, 23, at Attantic.

Precipitation.—The average was 1.60 above the normal of the last 15 years; greatest monthly, 11.02, at Berlin; least monthly, 0.68, at Crystal Falls.

Wind.—Prevailing direction, northwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

Temperature.—Maximum, 79, at Crookston, 2d; minimum, 12, at Pokegama Falls, 31st; greatest monthly range, 64, at Pokegama Falls; least monthly range, 42, at Duluth and Farmington.

Precipitation.—Greatest monthly, 5.14, at La Crosse, Wis.; least monthly, 1.64, at Morris.

Wind.—Prevailing direction, northwest.—*John Healy, Corporal, Signal Corps, Saint Paul, in charge.*

MISSISSIPPI.

Temperature.—The mean was 2 below the normal; maximum, 95, at Vaiden, 5th and 9th; minimum, 26, at Aberdeen, 31st; greatest monthly range, 64, at Vaiden; least monthly range, 36, at Bay Saint Louis.

Precipitation.—The average was 0.04 above the normal; greatest monthly, 6.31, at Moss Point; least monthly, 0.17, at Jackson.—*R. B. Fulton, Signal Corps, University, director.*

MISSOURI.

Temperature.—The mean was 1.1 above the normal; maximum, 91, at Protem, 12th; minimum, 22, at Fayette.

Precipitation.—Greatest monthly, 5.08, at Kansas City; least monthly, 0.38, at Fox Creek.—*Prof. Francis E. Nipher, Saint Louis, director.*

METEOROLOGICAL REPORT OF THE MISSOURI STATE BOARD OF AGRICULTURE.

Temperature.—Maximum, 91, at Protem, 12th; minimum, 16, at Centreville, 31st; greatest monthly range, 67, at Adrian, and Centreville; least monthly range, 44, at Warrenton.

Precipitation.—Greatest monthly, 5.19, at Carrollton; least monthly, 0.40, at New Haven.

Wind.—Prevailing direction, south.—*Levi Chubbuck, Secretary of State Board of Agriculture, Columbia, director; A. L. McRae, Sergeant, Signal Corps, assistant.*

NEBRASKA.

Temperature.—The mean was nearly normal; maximum, 92, at Superior; minimum, 8, at Alliance.

Precipitation.—The rainfall was nearly normal; there was less than 1.00 in the west part of the state, and in the east half more than 1.00, with a maximum rainfall of 3.28 at Superior.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Sergeant, Signal Corps, assistant.*

NEVADA.

Temperature.—The mean was 2.2 below the normal; maximum, 92, at El Dorado Canyon, 7th; minimum, 8, at Pioche, 11th; greatest monthly range, 65, at Pioche; least monthly range, 21, at Austin.

Precipitation.—The average was 0.44 below the normal; greatest monthly, 1.25, at Downeyville; least monthly, 0.00, at several stations.—*Prof. Charles W. Friend, Carson City, director; H. E. Wilkinson, Corporal, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

Temperature.—The mean was 1.0 below the normal; maximum, 84, at Lowell (d), 2d; minimum, 12, at West Milan, 23d; greatest monthly range, 63, at West Milan; least monthly range, 29, at Nantucket and Block Island.

Precipitation.—The average was 3.20 above the normal; greatest, 10.85, at Westborough; least monthly, 2.02, at Burlington.

Wind.—Prevailing direction, northwest.—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; J. Warren Smith, Private, Signal Corps, assistant.*

NEW JERSEY.

Temperature.—The mean was 0.4 below the normal; maximum, 81, at Beverly, 1st; minimum, 24, at Tenafly, 31st; greatest monthly range, 53, at Beverly; least monthly range, 33, at Ocean City.

Precipitation.—The average was 3.14 above the normal; greatest monthly, 10.18, at Oceanic; least monthly, 3.40, at Ocean City.

Wind.—Prevailing direction, northwest.—*E. W. McGann, Sergeant, Signal Corps, New Brunswick, in charge.*

NEW YORK.

The month was unusually wet and cool.

Temperature.—Maximum, 82, at East Hampton, 1st; minimum, 24, at Hyndsville, 2d, and at Marshland, 14th; greatest monthly range, 53, at Keene Valley and Rondout; least monthly range, 34, at Brooklyn and Setauket.

Precipitation.—Greatest monthly, 10.20, at Setauket; least monthly, 2.25, at Massena.

Wind.—Prevailing direction, northwest.—*Prof. E. A. Fieries, Ithaca, director; R. M. Hardinge, Private, Signal Corps, assistant.*

NORTH CAROLINA.

Temperature.—The mean was 2.4 below the normal; maximum, 83, at Washington, 7th; minimum, 22, at Franklin, 28th.

Precipitation.—The average was 0.50 above the normal; greatest monthly, 7.61, at Washington; least monthly, 1.88, at Wilmington.

Wind.—Prevailing direction, northwest.—*Dr. Herbert B. Battle, Raleigh, director; C. F. von Herrmann, Sergeant, Signal Corps, assistant.*

NORTH AND SOUTH DAKOTA.

Temperature.—The mean was 1.3 above the normal; maximum, 85, at Fort Sully, S. Dak., 3d, and at Millbank, S. Dak., 2d; minimum, 10, at Howard, S. Dak., 26th; greatest monthly range, 75, at Steele, N. Dak.; least monthly range, 47, at Scranton, S. Dak.

Precipitation.—The average was about 0.31 below the normal; greatest monthly, 3.59, at Grand Forks, N. Dak.; least monthly, 0.25, at Onida, S. Dak.

Wind.—Prevailing direction, northwest.—*S. W. Glenn, Sergeant, Signal Corps, Huron, S. Dak., in charge.*

OHIO.

Temperature.—The mean for the northern section, middle section, the southern section, and of the state was 1.2, 1.6, 1.3, and 1.4, respectively, above the average for the sections and the state; maximum, 85, at Logan

and Georgetown, 12th, and at Hanging Rock, Waverly, and Logan, 13th; minimum, 29, at Yellow Springs, 30th.

Precipitation.—The average for the northern section, the middle section, the southern section, and the state was 2.79, 1.13, 0.60, and 1.51, respectively, above the normal for the sections and state; greatest monthly, 8.29, at Jefferson; least monthly, 1.45, at Greenville.—*Prof. B. F. Thomas, Columbus, director; C. M. Strong, Sergeant, Signal Corps, secretary and assistant.*

OREGON.

The characteristics of the month were the deficiency in temperature and precipitation.

Temperature.—The mean was 1.4 below the normal; maximum, 81, at Lakeview, 29th; minimum, 11, at North Powder, 13th.

Precipitation.—The average was 0.89 below the normal; greatest monthly, 6.89, at Cascade Locks; least monthly, trace, at Beulah.

Wind.—Prevailing direction, southwest.—*Hon. H. E. Hayes, Master State Grange, Oswego, director; B. S. Pague, Sergeant, Signal Corps, assistant.*

PENNSYLVANIA.

Temperature.—The mean was 1.0 below the normal; maximum, 81, at Selin's Grove, 15th; minimum, 21, at Dyberry, 31st; greatest monthly range, 55, at Wilkes Barre; least monthly range, 36, at Altoona.

Precipitation.—The average was 2.50 above the normal; greatest monthly, 8.41, at Eagle's Mere; least monthly, 4.03, at Mauch Chunk.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant.*

SOUTH CAROLINA.

Temperature.—Maximum, 90, at Spartanburgh, 12th; minimum, 22, at Spartanburgh, 28th and 30th; greatest monthly range, 68, at Spartanburgh; least monthly range, 41, at Camden and Conway.

Precipitation.—Greatest monthly, 7.19, at Evergreen; least monthly, 0.99, at Branchville.—*A. P. Butler, director, State Weather Service, and observer, Signal Service.*

TENNESSEE.

The meteorological features of the month were for the most part normal.

Temperature.—The mean was about normal; maximum, 88, at Franklin, 12th; minimum, 26, at Hohenwald, 31st; greatest monthly range, 58, at Franklin and Hohenwald; least monthly range, 46, at Greeneville and Jacksboro.

Precipitation.—The average was considerably in excess of the normal for the last eight years; greatest monthly, 5.80, at Dare; least monthly, 1.22, at Strawberry Plains.

Wind.—Prevailing directions, west and northwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

Temperature.—The mean was normal in all parts of the state except in the vicinity of the coast and over the eastern portions, where it averaged 1.0 below the normal; maximum, 98, at Rio Grande City, 5th; minimum, 25, at Coldwater, 15th; greatest monthly range, 64, at Coldwater; least monthly range, 18, at La Grange.

Precipitation.—The average was about normal in the vicinity of the coast, from 1.00 to 3.00 above over the central and eastern portions, and 1.00 below over the other portions of the state; greatest monthly, 9.01, at Palestine; least monthly, 0.24, at Coldwater.—*D. D. Bryan, Galveston, director; I. M. Cline, Sergeant, Signal Corps, assistant.*

WISCONSIN.

Temperature.—The mean was 1.5 below the normal; maximum, 78, at Hayward, 1st; minimum, 16, at Hayward, 16th.

Precipitation.—The average was 1.24 above the normal; greatest monthly, 5.89, at Onkosh; least monthly, 2.02, at Plover.

Wind.—Prevailing direction, northwest.—*R. E. Kerkam, Sergeant, Signal Corps, in charge.*

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, October, 1890.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Alabama.	0	0	0	Ins.	Alaska.	0	0	0	Ins.
Bermuda *f.....	85	36	62.7	2.96	Juneau.....	59	30	43.3	11.31
Citronelle.....	93	37	66.4	4.06	Killiknoo.....	50	30	40.3	7.55
Columbiana f.....	84	29	61.3	5.96	Arizona.				
Decatur (1) f.....	85	26	59.2	2.37	Ariz. Canal Co. Dam.....	96	45	71.9	0.87
Decatur (2) f.....	85	26	59.2	2.06	Benson.....	83	46	64.2	0.41
Double Springs f.....	79	30	58.7	3.53	Bisbee f.....	75	41	59.2	1.06
Enfau f.....	87	47	66.8	3.05	Calabasas.....				0.10
Evergreen f.....	87	34	64.8	5.63	Cana Grande.....	100	53	74.1	0.38
Fort Deposit.....	89	36	64.9	1.90	Chino.....	78	30	55.1	3.00
Livingston (1) f.....	84	34	59.1	2.82	Chiricahua M'ts.....				2.85
Livingston (2) f.....	86	33	62.4	1.99	Cooley's f.....	71	24	48.4	5.78
Marion f.....	87	30	60.3	3.75	Crittenden.....				1.42
Mt. Vernon B'ks.....	90	35	63.0	5.10	Dragon f.....				1.01
Opelika f.....	83	30	60.8	7.33	Dragon Summit.....	80	62	69.8	1.41
Pine Apple f.....	86	33	63.5	5.53	Doa Cabos f.....				1.12
Selma (2) f.....	89	34	63.9	2.66	Dudleyville.....				0.84
Tusculum (2).....	84	38	58.7	3.00	Eagle Pass.....				1.75
Valley Head f.....	85	24	55.1	3.44	Farley's Camp.....	45	74.6	3.40	

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Arizona—Cont'd.	0	0	0	Ins.	California—Cont'd.	0	0	0	Ins.
Florence f.....	91	37	66.1	0.41	Evergreen.....				0.00
Fort Apache.....	83	28	55.3	1.91	Farmington*.....	92	45	63.9	0.00
Fort Bowie.....	76	43	60.8	1.60	Felton*.....	95	35	66.6	0.00
Fort Grant.....	78	39	61.4	1.62	Fernando*.....	95	38	67.0	0.00
Fort Huachuca.....	80	40	62.0	0.37	Florence*.....	95	48	61.1	0.00
Fort Lowell.....	98	35	67.2	0.77	Folsom*.....	95	48	61.3	0.05
Fort McDowell.....	97	39	70.5	1.07	Fort Gaston.....	82	31	55.8	0.54
Gila Bend (1)*.....	88	56	74.7	0.00	Fort Mason.....	81	45	58.8	0.00
Gila Bend (2).....	100	55	73.3	0.05	Fresno.....	90	50	69.3	0.00
Grand Central Mill.....				0.90	Fruto.....	91	41	64.0	0.00
Holbrook f.....	75	24	51.8	0.62	Galt.....	95	45	63.2	0.00
Lochiel.....	77	42	57.5	0.88	Georgetown f.....	82	38	59.6	0.19
Maricopa.....	81	61	69.4	0.07	Gilroy*.....	92	40	61.2	0.00
Mount Huachuca.....	83	38	59.5	0.69	Girard*.....	95	35	59.4	0.00
Natural Bridge f.....				1.46	Glen Ellen.....	90	31	59.5	0.06
New River f.....	86	40	64.6	0.37	Goshen.....	86	50	70.0	0.00
Oro.....				1.80	Grass Valley.....				0.05
Pantano.....	98	53	71.9	0.75	Haywards*.....	76	42	56.5	0.00
Payson.....				2.06	Hollister*.....	92	39	59.7	0.00
San Carlos.....		35		1.22	Hornbrook*.....	75	30	52.8	0.00
Show Low f.....				1.10	Imperial.....	86	40	59.4	0.00
Signal f.....	90	43	67.2	1.49	Iowa Hill.....	86	45	61.7	0.35
Strawberry.....				1.83	Julian*.....	77	42	58.4	0.00
Tempe.....				0.15	Keeler*.....	78	55	66.8	0.03
Teviston.....				0.00	Keene*.....	84	38	58.7	0.00
Texas Hill.....	94	50	72.9	0.03	Kingsburgh*.....	86	40	62.1	0.00
Tip Top f.....		45	63.6	2.36	King City*.....	99	32	65.2	0.00
Tombstone.....	86	40	63.9		Knights Landing*.....	84	49	63.4	0.00
Tucson (1) f.....	89	41	67.0	0.62	La Grange*.....	92	42	64.5	T.
Tucson (2).....	93	64	77.8	0.65	Lathrop.....	85	45	64.7	0.00
Walnut Grove f.....				1.60	Laurel*.....	93	40	63.5	0.00
Walnut Ranch f.....				2.11	Lemoore*.....	85	42	64.5	0.00
Whipple Barracks.....	82	26	54.2	1.40	Livermore.....	90	48	65.5	0.00
Willcox*.....	85	50	65.6	0.88	Livingston*.....	92	44	66.7	0.00
Wilgus.....				1.25	Long Beach.....	96	50	65.0	0.00
Woodruff.....				0.50	Los Angeles*.....	96	46	66.7	0.02
Yuma.....	92	55	69.6	1.70	Los Banos (2).....	80	52	68.2	0.00
Arkansas.					Los Gatos (1).....	88	46	65.3	0.00
Arkansas City f.....				3.47	Los Gatos (2).....	85	41	61.6	0.00
Camden f.....	84	37	61.7	4.46	Mammoth Tank.....	96	52	74.9	0.30
Conway.....	82	34	58.6	2.57	Martinez*.....	82	47	62.7	0.00
Dardanelle.....				3.40	Milton (near).....	82	46	66.5	T.
Devall's Bluff.....	85	26	60.4	2.05	Marysville.....	90	56	66.5	0.00
Forrest City f.....	86	32	62.6	2.01	Menlo Park*.....	86	41	58.9	0.00
Fulton.....				1.48	Merced.....	113	40	65.8	0.00
Harrisburgh.....	85	28	57.8	3.18	Modesto*.....	86	47	67.3	0.02
Helena (1) f.....				4.17	Mojave*.....	85	41	64.0	0.00
Helena (2).....				3.26	Monson.....	87	45	62.0	0.00
Hot Springs.....	87	31	60.5	2.25	Montague.....	72	46	56.4	0.00
Lead Hill*.....	91	30	59.9	2.25	Monterey*.....	86	36	58.7	0.00
Lonoke.....	86	35	63.1	1.75	Monterey (H. d. M.).....	87	38	57.6	0.00
Malvern.....	84	32	60.1	0.18	Napa*.....	72	42	54.9	0.00
Newport (1) f.....				2.26	Newhall.....	97	35	63.0	0.00
Newport (2).....	86	28	59.4	2.56	Newman.....	86	54	70.5	0.00
Oacela.....	87	28	58.9	2.91	Niles*.....	86	42	60.8	0.00
Ozone.....	79	34	57.2	3.63	Norwalk*.....	100	53	71.5	0.00
Pine Bluff.....	86	34	63.0	1.48	Oakland (1).....	90	43	61.8	0.00
Prescott.....	81	38	61.8	3.09	Oakland (2)*.....	72	40	58.5	0.00
Russellville.....	84	33	60.8	2.74	Ogilby.....	105	58	79.8	0.14
Stuttgart.....	85	26	59.2	2.56	Ontario*.....	100	45	72.0	0.16
Texarkana.....	86	35	64.4	3.09	Orland f.....	97	45	67.6	0.00
Washington.....	86	35	63.5	3.55	Oroville.....	87	45	67.9	0.00
Winslow.....	84	33	58.8	3.13	Pajaro*.....	100	33	58.7	0.00
California.					Paso Robles*.....	88	35	58.8	0.00
Alcende.....	85	50	67.2	0.00	Petaluma*.....	90	41	64.7	0.00
Alcatraz Island.....	85	45	59.0	0.00	Placerville (1)*.....	87	42	60.8	0.00
Almaden.....	86	45	62.5	0.00	Placerville (2)*.....	79	33	55.7	T.
Anaheim*.....	100	56	68.7	0.00	Pomona.....	106	44	69.8	0.04
Angel Island.....	91	40	62.2	0.00	Porterville.....	87	42	59.0	0.00
Antioch*.....	82	54	64.1	0.04	Presidio of S. F.....	84	40	60.9	0.00
Aptos*.....	90	38	59.3	0.40	Puente*.....	93	45	66.6	0.00
Athlone*.....	92	40	65.7	0.00	Ravenna.....	90	32	63.9	0.00
Auburn.....	87	40	63.1	0.14	Redding*.....	98	45	64.1	0.00
Bakersfield*.....	86	48	65.8	0.00	Riverside.....	97	38	63.0	0.07
Barstow f.....	89	37	63.4	0.00	Rocklin.....	89	45	64.9	0.00
Beaumont.....	90	40	66.4	0.00	Rumsey*.....	89	48	67.0	0.00
Belmont*.....	85	42	62.6	0.00	Sacramento (1).....	75	34	53.9	0.01
Benicia Barracks.....	89	45	64.6	0.00	Sacramento (2).....	76	47	61.4	0.00
Berendo.....	85	52	66.9	0.00	Salinas (1)*.....	94	44	57.39	0.00
Berkeley.....	86	46	59.8	0.00	Salinas (2)*.....	95	42	59.9	0.00
Bishop Creek.....	85	40	59.5	0.00	Salton.....	100	48	72.6	0.00
Boca.....	83	22	48.9	0.70	Sanger Junction*.....	95	48	67.6	0.00
Boulder Creek*.....	90	29	54.8	0.00	San Ardo*.....	96	42	65.6	0.00
Brighton*.....	94	50	66.9	0.00	San Diego B'ks.....	89	46	65.5	0.02
Byron*.....	84	59	66.0	0.00	San Gabriel.....	90	36	61.5	0.00
Caliente.....	88	43	63.3	0.00	San Jose*.....	85	42	60.5	0.00
Calistoga.....	88	34	60.0	0.00	San Mateo*.....	83	40	57.2	0.10
Castroville*.....	87	42	60.6	0.00	San Miguel*.....	96	46	67.3	0.00
Centerville*.....	93	48	58.2	0.00	San Pedro*.....	95	50	68.6	0.00
Chico*.....	92	47	63.7	0.00	Santa Ana.....	95	54	71.6	0.00
Cisco*.....	85	29	45.6	0.55	Santa Barbara (1).....	96	44	64.0	0.05
Colfax*.....	87	40	63.3	T.	Santa Barbara (2)*.....	89	49	65.4	0.00
Colton.....	100	39	69.4	0.00	Santa Cruz (1)*.....	92	42	61.2	0.00
Corning*.....	85	50	67.4	0.00	Santa Cruz (2)*.....	92	38	59.0	0.00
Crescent City.....				1.11	Santa Margarita*.....	86	30	55.8	0.00
Davisville.....	87	42	64.9	0.00	Santa Monica*.....	86	48	64.3	0.09
Delano.....	89	44	66.6	0.00	Santa Paula*.....	88	48	67.9	0.00
Delta*.....	88	35	59.7	0.40	Santa Rosa*.....	86	40	61.3	0.00
Downey*.....	94	52	69.7	0.00	Selma*.....	89	42	62.1	0.00
Dunnigan.....	88	49	67.2	0.00	Seven Palms*.....	98	40	69.0	0.00
El Dorado.....	89	45	64.7	0.10	Shingle Springs*.....	85	48	61.3	0.08
Elmira.....	90	47	68.3	0.00	Sims*.....	86	31	54.4	0.00
El Verano*.....	84	38	60.9	0.00	Sisson.....	73	27	46.2	0.13
Emigrant Gap.....	72	29	52.5	0.65	Soledad*.....	92	40	60.0	0.00
Esparto*.....	91	46	65.1	0.00	Sonoma.....	85	38	60.8	0.03

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>California—Cont'd.</i>					<i>Connecticut—Cont'd.</i>				
Soquel	86	40	59.7	0.00	Hartford (1)	72	31	49.4	7.05
South Vallejo	80	30	54.6	0.00	Hartford (2)	72	31	49.4	7.57
Spadra	100	41	66.5	0.00	Lake Konomoc	72	31	49.4	6.72
Steeles	91	39	64.1	0.00	Lebanon	72	31	49.4	7.11
Summit	72	27	45.9	0.00	Mansfield	74	32	47.6	5.25
Suisun City	74	44	59.4	T.	Middletown	73	30	49.1	7.52
Susanville	75	32	55.0	0.00	New Hartford (1)	70	25	43.9	6.41
Tehachapi	76	32	54.7	0.00	New Hartford (2)	72	30	48.4	7.45
Templeton	77	35	56.1	0.00	North Woodstock	72	30	48.4	6.34
Traver	78	40	59.3	0.00	Shelton	71	30	48.6	6.94
Truckee (1)	78	28	47.1	0.45	South Manchester	70	31	47.3	6.53
Tulare	83	45	66.4	0.00	Thompson	70	31	47.3	7.80
Turlock	85	45	63.3	0.00	Uncasville	72	30	49.4	8.05
Upper Mastole	82	34	59.2	0.81	Voluntown	72	30	49.4	7.21
Vacaville (1)	89	46	65.4	T.	Wallingford	75	28	49.6	6.59
Vacaville (2)	89	46	65.4	0.04	Waterbury	75	28	49.6	6.49
Valley Springs	86	45	63.8	0.00	West Simsbury	75	28	49.6	6.49
Vina	89	40	64.6	0.00	<i>Delaware.</i>				
Volcano Springs	110	45	71.2	0.00	Dover	75	32	54.8	7.24
Volta	86	51	65.5	0.00	Kirkwood	82	38	57.5	7.24
Walla Walla Ck.	69	28	50.3	0.10	<i>District of Columbia.</i>				
Walnut Creek	88	43	64.0	0.00	Kendall Green	74	33	55.5	3.80
Westley	84	53	70.3	0.00	Washington B'ks	76	33	57.4	3.80
Wheatland	89	39	63.6	T.	<i>Florida.</i>				
Whittier	90	60	71.8	0.00	Alva	95	45	73.8	3.21
Williams	72	48	58.8	0.00	Archer	95	39	72.0	6.47
Willow (1)	86	40	62.8	0.00	Fort Barrancas	95	43	68.9	10.46
Winters	90	50	67.7	0.00	Fort Meade	89	41	73.4	5.00
Woodland	85	50	64.9	0.00	Gainesville	88	42	71.8	3.37
<i>Colorado.</i>					Homeland	90	46	74.7	3.00
Abbot	82	41	56.0	0.50	Hypoluxo	83	33	74.9	2.75
Agate	82	41	56.0	0.50	Madison	83	33	74.9	2.75
Alma	54	12	33.1	0.84	Manatee	93	45	74.3	4.26
Amherst	77	44	62.0	0.00	Merritt's Island	88	50	75.5	3.85
Apishapa	77	44	62.0	0.00	St. Francis B'ks	87	45	71.4	4.02
Aroya	85	39	56.0	0.70	San Antonio	90	50	70.7	5.36
Bennet	85	39	56.0	0.70	Tallahassee	87	40	66.8	5.45
Box Elder	85	39	56.0	0.80	Villa City	91	42	73.2	2.11
Breckenridge	85	39	56.0	0.80	<i>Georgia.</i>				
Brush	85	39	56.0	0.80	Albany	88	40	67.5	4.44
Byers	70	40	50.4	T.	Allapaha	88	34	66.6	3.83
Castle Rock	84	16	47.6	0.40	Americus	86	34	64.2	4.43
Chromof	84	16	47.6	0.40	Athens (1)	82	34	59.2	6.11
Climax	55	5	28.6	1.93	Athens (2)	82	34	59.2	6.11
Cromo (near)	57	8	33.1	0.91	Bainbridge	86	40	67.1	5.04
Crook	75	22	46.1	0.80	Blakely	92	44	71.6	4.66
Cumbria	56	7	35.3	3.26	Camak	85	34	62.4	5.40
Deer Trail	70	30	45.4	T.	Cartersville	84	30	59.6	6.06
Delta	71	23	45.6	1.42	Columbus	80	40	62.8	3.84
Dillon	71	23	45.6	1.42	Diamond	92	32	55.2	7.62
Eagle Farm	71	23	45.6	1.42	Eastman	94	36	65.9	4.55
Elkhorn	71	23	45.6	1.42	Forsyth	90	40	64.7	5.89
Emma	71	23	45.6	1.42	Fort Gaines	88	38	65.6	4.19
First View	71	23	45.6	1.42	Fort McPherson	80	30	56.6	6.70
Fort Collins	77	16	47.4	0.70	Gainesville	80	30	56.6	6.70
Fort Collins (near)	77	16	47.4	0.70	Griffin	84	32	61.6	4.32
Fort Lewis	70	21	44.2	1.49	Lithia Springs	84	32	61.6	4.32
Fort Logan	80	20	50.2	0.05	Louisville	92	36	65.0	3.72
Fort Morgan	81	25	43.4	1.00	Macon	90	36	68.4	4.94
Fruita	72	23	46.4	0.49	Marietta	81	31	57.4	5.60
Georgetown	60	23	41.8	0.92	Milledgeville	89	35	64.3	5.59
Greenhorn	73	23	45.4	0.52	Millen	92	34	64.4	4.00
Hugo	71	28	51.4	0.25	Monticello	82	38	59.4	6.49
Husted	78	15	47.2	0.73	Newnan	82	30	59.8	5.84
Kirk	71	23	45.6	1.42	Perry	82	30	59.8	5.84
Kit Carson	70	38	52.4	T.	Point Peter	90	36	65.0	3.45
Lamar	84	20	53.4	0.37	Poulan	90	36	65.0	3.45
La Porte	84	20	53.4	0.37	Quitman (1)	87	42	67.7	3.30
Las Animas	80	20	51.4	0.03	Quitman (2)	88	40	68.8	2.20
Lay	80	20	51.4	0.03	Thomasville (1)	90	39	69.1	6.23
Leadville	55	10	32.1	0.77	Thomasville (2)	90	39	69.1	6.23
Le Roy	80	25	48.0	0.98	Toccoa	78	32	57.6	5.97
Magnolia	79	30	46.0	0.20	Union Point	86	32	61.8	4.59
Monte Vista	70	12	41.0	0.00	Washington	84	32	60.2	4.96
Morraine	62	18	41.7	1.34	Way Cross	88	42	72.4	2.17
Pagosa Springs	70	16	39.6	2.02	Waynesborough	89	35	64.8	4.55
Parachute	70	16	39.6	2.02	West Point	84	38	64.8	6.27
Pinkhampton	70	16	39.6	2.02	<i>Idaho.</i>				
Red Cliff	83	22	50.8	0.00	American Falls	69	17	42.2	0.93
Rocky Ford	83	22	50.8	0.00	Beaver	72	23	47.1	0.77
Saint Cloud	83	22	50.8	0.00	Boisé Barracks	72	23	47.1	0.77
Sanborn	83	22	50.8	0.00	Era	67	13	41.4	0.77
San Luis Ex. Sta.	70	14	43.6	0.21	Fort Sherman	78	27	47.3	1.40
Sedgwick	70	14	43.6	0.21	Henry's Lake	63	10	37.0	0.99
Sheridan Lake	70	14	43.6	0.21	Kootenai	69	25	43.0	3.07
Smoky Hill Mine	70	14	43.6	0.21	Mullan	70	23	40.6	2.61
Stamford	70	14	43.6	0.21	Payette	73	15	46.4	0.11
Sterling	93	22	55.7	1.85	<i>Illinois.</i>				
T. S. Ranch	71	25	49.4	0.15	Atwood	88	20	54.0	2.56
Thon	84	18	49.0	0.15	Aurora (1)	76	25	49.8	4.53
Upper Pine	84	18	49.0	0.15	Aurora (2)	77	27	50.7	5.14
Vilas	84	18	49.0	0.15	Beardstown	77	27	50.7	5.14
Villa Grove	84	18	49.0	0.15	Beason	77	27	50.7	5.14
Waterville	84	18	49.0	0.15	Belvidere	75	23	52.2	2.90
Watkins	76	32	47.7	0.12	Centralia	86	26	48.9	5.81
Wray	76	32	47.7	0.12	Charleston	89	28	55.0	1.44
Yuma	76	32	47.7	0.12	Cockrell	77	29	51.0	2.19
<i>Connecticut.</i>					Collinsville	88	25	56.0	0.85
Birmingham	71	28	48.4	7.17	East Peoria	94	26	56.9	2.42
Canton	71	28	48.4	7.17	Fort Sheridan	73	12	49.8	6.02
Colchester	75	29	49.4	5.40	Galeonda	84	31	57.4	2.90
Falls Village	75	29	49.4	5.40	Grand Tower	80	22	54.5	1.90
Fort Trumbull	77	33	53.1	7.40	Greenville	86	22	51.8	1.00
					Griggsville	80	25	51.8	1.48

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Illinois—Cont'd.</i>					<i>Iowa—Cont'd.</i>				
Hennepin	80	25	50.8	5.57	Monticello	80	18	48.0	6.82
Lacon	81	26	51.7	3.95	Mount Pleasant	81	26	49.6	3.01
Lanark	72	25	48.4	5.43	Mount Vernon	81	23	51.3	4.65
Louisville	86	28	52.8	1.38	Osage	82	17	43.3	5.15
Martinsville	81	31	57.3	1.45	Oskaloosa (1)	82	25	50.9	1.99
Mattson	84	34	54.2	2.05	Panama	77	26	51.3	1.90
McLeansborough	89	26	54.9	1.13	Stilwell	79	15	46.1	2.65
Mount Carmel	85	23	52.3	2.35	Storm Lake	73	22	47.8	2.57
Olney (1)	86	33	56.2	1.60	Vinton	79	21	47.9	4.47
Olney (2)	85	33	53.9	1.38	Washington	84	23	48.1	2.45
Oswego	76	24	49.4	4.60	Webster City	78	16	46.9	5.00
Ottawa	80	28	53.0	3.89	West Bend	73	18	45.9	4.05
Palestine	86	30	52.8	2.97	<i>Kansas.</i>				
Pana	87	30	57.5	1.16	Abilene	86	30	55.5	2.24
Peoria (1)	86	26	54.7	3.17	Allamore	84	27	52.8	0.46
Peoria (2)	86	26	54.7	3.17	Alton	86	25	53.7	1.76
Philo	86	26	54.7	3.17	Altamont	86	25	53.7	1.76
Pontiac	84	24	52.4	2.61	Buffalo Park	82	22	50.0	0.50
Riley	74	24	48.9	5.38	Burr Oak	86	26	55.4	2.25
Rockford	73	26	49.4	5.98	Cawker City	88	33	52.8	0.90
Rock Island	81	25	52.6	4.38	Coldwater	84	22	50.4	0.37
Rushville	87	23	52.4	1.49	Collyer	84	22	50.4	0.37
Sandwich	74	20	46.6	4.16	Columbus	89	28	55.5	0.83
South Evanston	73	32	50.0	5.00	Cunningham	89	28	55.5	0.83
Sycamore	74	24	48.3	3.48	Downs	89	28	55.5	0.83
Warren	71	22	48.3	3.48	Dwight	89	28	55.5	0.83
Warsaw	80	29	51.4	1.08	Elco	88	31	57.1	4.15
Watsika	80	29	51.4	1.08	Elk Falls	83	32	55.5	3.54
White Hall	90	26	56.8	1.05	Ellis (2)	80	25	50.0	0.00
Winnebago	78	28	57.3	6.40	Emporia	80	30	55.2	4.39
<i>Indiana.</i>					Englewood	88	32	57.2	2.29
Angola	76	33	54.4	3.85	Eureka Ranch	85	22	56.2	0.45
Butler	78	30	54.4	3.39	Ft. Leavenworth (1)	79	27	55.5	3.49
Cannelton	85	38	56.3	1.95	Ft. Leavenworth (2)	76	28	53.2	3.20
Columbia City	78	30	51.2	4.00	Fort Riley	85	28	55.1	2.74
Columbus	82	32	53.3	3.01	Fremont	87	21	55.4	1.24
Connersville	80	32	50.7	2.98	Globe	80	30	51.7	5.02
De Gonia Springs	82	32	55.7	2.18	Gove City	85	27	52.8	0.60
Delphi	77	26	50.3	2.49	Grainfield	84	32	56.4	0.50
Evansville	82	30	52.9	2.32	Grenola	88	32	57.7	3.30
Farmland	83	32	52.8	3.39	Grinnell	84	30	56.4	0.45
Franklin	85	34	54.7	2.10	Halstead	83	31	57.6	2.64
Huntingburg	85	34	54.7	2.10	Havensville	80	19	50.1	5.00
Huntington	84	34	55.8	3.49	Horton	86	26	54.8	2.24
Jeffersonville	82	28	53.8	2.70	Hoxie	85	30	56.0	0.38
La Fayette	82	28	53.8	2.70	Independence	88	30	58.3	3.65
Logansport (1)	75	30	51.3	2.55	Junction City	83	25	54.9	4.15
Logansport (2)	85	35	57.2	4.60	Kansas City	89	30	58.4	3.85
Marengo	81	27	48.6	3.57	Kellogg	89	30	58.4	3.85
Mauzy	81	27	48.6	3.57	Kingman	89	30	58.4	3.85
Mount Vernon (1)	84	32	54.3	3.71	Kirwin	82	16	56.6	1.05
Mount Vernon (2)	84	32	54.3	3.71	La Crosse	82	16	56.6	1.05
Muncie	84	34	56.7	2.05	La Harpe	86	38	54.5	3.44
Point Isabel	78	20	47.6	3.40	Lakin	86	15	51.9	0.05
Princeton	85	30	55.9	2.01	Larned	80	25	54.6	1.06
Rockville	82	30	54.6	2.92	Lawrence	80	28	54.8	5.35
Rushville	85	30	55.0	4.42	Lebo	88	26	56.0	0.98
Seymour	77d	35	55.3	3.44	Lincoln	84	30	56.4	0.25
Shelbyville	81	26	53.2	4.15	Luray	84	22	56.4	2.80
Sumner	81	26	53.2	4.15	Macksville	81	21	52.4	1.06
Valparaiso	73	28	51.4	3.63	Manhattan (1)	86	23	53.4	1.99
Vevay	85	32	56.4	3.07	Manhattan (2)	80	26	53.7	1.98
Vincennes	84	32	54.4	2.21	Manhattan (3)	87	24	56.8	2.73
Worthington	84	32	54.4	2.21	Marmaton	82	28	56.8	1.00
<i>Indian Territory.</i>					McAllister	86	22	55.0	0.00
Eufaula	84	33	60.1	4.96	Minneapolis	82	30	50.2	0.75
Fort Reno	88	31	59.7	0.71	Monument	84	24	55.4	0.90
Fort Sill	88	40	61.0	4.20	Morse	84	24	52.5	0.40
Fort Supply	83	39	60.9	4.29	Norton	84	24	52.5	0.40
Guthrie	83	39	60.9	4.29	Oakley	85	32	57.4	0.25
Healdton	83	39	60.9	4.29	Oberlin	85	32	57.4	0.25
Tulsa	83	39	60.9	4.29	Ogallah	85	32	57.4	0.25
<i>Iowa.</i>					Oswego	88	32	57.4	5.25
Afton	76	22	49.5	4.90	Page City	80	24	50.2	2.07
Alta (1)	72	20	48.1	2.56	Plainville	84	32	58.0	1.50
Amana	80	22	49.4	4.69	Quinter	86	32	58.0	1.36
Ames	76	22	49.2	2.38	Rome	85	32	55.3	1.33
Atlantic	79	17	48.2	2.36	Salina	91	35	59.9	2.97
Bancroft	74	19	46.5	2.40	Sedan	81	26	54.0	1.58
Belle Plaine	81	22	48.6	3.86	Seneca	86	32	58.0	0.65
Blakeville	84	24	50.8	5.45	Sharon Springs	82	24	51.4	2.59
Carroll	78	19	48.8	2.70	Tribune	84	30	53.4	0.16
Carson	79	22	51.6	1.94	Wakefield	84	30	53.4	0.16
Cedar Falls	78	20	50.6	4.62	Wa Keeney	84	30	53.4	0.16
Cedar Rapids	79	22	49.2	5.30	Wallace (1)	84	30	53.4	0.16
Clarinda	76	26	51.7	1.65	Wallace (2)	84	30	53.4	0.16
Clinton	81	23	49.8	3.76	Wellington	87	31	60.1	2.63
Cresco	71	16	44.9	3.98	Weskan	82	32	58.1	0.40
Eagle Grove	78	17	47.8	4.50	Winona	81	31	58.1	0.40
Fayette	78	17	47.0	4.56	Yates Centre	81	31	58.1	0.40
Fort Madison	84	30	51.7	4.13	<i>Kentucky.</i>				
Glenwood (1)	77d	26d	53.0	2.22	Bowling Green	79	35	52.6	3.33
Greenfield	79	20	49.9	2.95	Burnside	84	28	56.2	3.89
Grinnell	77	22	49.6	6.09	Caddo	84	28	56.2	3.89
Hampton	77	17	44.9	3.52	Cattletown	84	28	56.2	3.89
Humboldt	77	18	47.3	2.90	Central City	86	32	59.6	2.00
Independence	76	26	48.7	4.19	Earlinton	86	32	59.6	2.00
Indianola	79	20	52.0	2.13	Eddyville	80	30	57.2	5.47
Iowa City	75	28	50.8	2.11	Edmonton	80	30	57.2	5.47
Larabee	75	28	50.8	2.11	Falmouth (1)	87	27	54.1	2.93
Lee Claire	75	28	50.8	2.11	Frankfort (1)	85	31	58.1	3.80
Logan	82	27	53.8	1.87	Frankfort (2)	87	27	54.1	2.93
Manson	74	24	44.7	4.93	Franklin	85	31	58.1	3.80
Maquoketa	78	20	49.5	4.45					
McAuland	77	24	47.1	3.68					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip. in.	Stations.	Temperature. (Fahrenheit.)			Precip. in.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Kentucky—Cont'd.					Massachusetts—Con.				
Greensburg f.....	86	27	53.8	3.58	Leicester.....	72	32	46.6	7.92
Harrodsburg f.....	86	27	53.8	3.58	Leominster.....	72	31	50.6	10.66
Louisville f.....	83	30	53.9	3.24	Long Plain.....	73	29	48.0	7.71
Mount Sterling f.....	86	33	55.2	4.37	Lowell (1).....	73	27	47.3	
Newport Barracks.....	86	33	55.2	4.37	Lowell (2).....	73	27	47.3	
Paducah f.....	85	33	55.0	3.77	Lowell (3).....	73	27	47.3	
Pellville f.....	86	23	55.4	2.15	Ludlow (1).....	73	26	46.2	6.22
Princeton f.....	82	29	55.2	2.71	Ludlow (2).....	79	27	48.9	4.47
Shelbyville f.....	86	29	54.1	3.28	Lynn.....	68	32	47.3	7.36
Louisiana.					Mansfield.....	77	31	49.0	7.59
Abbeville.....	87	45	69.7	8.04	Medford.....				8.92
Alexandria.....	90	36	67.0	3.93	Middleborough.....	74	25	48.2	10.55
Amite City.....	92	35	67.6	3.57	Milton.....	73	32	48.3	8.22
Baton Rouge.....	92	34	67.6	6.09	Monson.....	75	32	47.5	5.81
Cameron.....	94	40	70.0	4.61	Mount Nonotuck.....				6.91
Cheneyville.....	88	34	65.4	2.99	Mystic Lake.....				9.39
Clinton d.....	87	43	67.8	4.35	Mystic Station.....				8.39
Coushatta (1) f.....	90	35	65.9	4.91	New Bedford (1).....	69	34	49.2	10.01
Coushatta (2).....	90	35	65.9	5.23	New Bedford (3).....	72	32	50.2	9.73
Crowley.....	89	40	70.4	7.52	Newburyport (1).....	76	33	48.5	7.20
Delhi f.....				3.50	Newburyport (2).....				7.63
Edgard.....	88	44	68.8	4.52	Northampton.....	74	32	49.2	7.91
Emilie.....	88	40	66.7	4.63	North Billerica.....	73	26	48.6	7.75
Farmerville.....	87	40	62.4	3.80	Plymouth.....	71	37	51.3	9.38
Girard f.....				51.55	Princeton.....	73	30	46.8	10.04
Grand Coteau.....	86	37	66.8	4.98	Provincetown.....	70	38	50.7	6.78
Homer.....	84	40	64.3	2.90	Roberts' Dam.....				8.89
Houma.....	88	42	65.0	6.13	Royalston.....				11.62
Jackson Barracks.....	90	42	68.7	5.79	Salem (2).....				7.35
Jeanerette.....	91	39	67.6	5.16	Somerset.....	76	30	51.5	9.61
La Fayette.....	90	38	68.4	7.24	South Hingham.....				10.81
Lake Charles.....	83	40	62.3	3.50	Springfield Army.....	73	31	49.6	6.70
Liberty Hill.....	90	35	64.0	5.79	Swampscott.....	70	33	50.3	6.17
Luling d.....	88	36	65.8	6.23	Taunton (1) f.....	81	30	49.4	9.23
Mandeville.....	90	37	67.2	3.45	Taunton (2).....	75	30	49.8	9.51
Marksville.....	87	33	65.6	3.26	Taunton (3).....	78	26	48.1	10.44
Maurepas.....	88	40	65.6	4.95	Wakefield.....	76	27	47.5	5.58
Melville f.....	89	36	66.2	4.38	Waltham.....				10.48
Minden.....	88	35	64.4	4.24	Wellesley.....	70	26	48.0	9.95
Monroe f.....	86	37	63.8	4.04	Westborough.....	77	27	49.6	10.85
New Iberia.....	90	41	69.0	5.42	Winchester.....				8.39
Paincourtville.....	88	40	67.6	5.66	Worcester (1).....	73	32	47.2	9.24
Shell Beach.....	87	44	67.8	6.01	Michigan.				
Sugar Ex. Station.....	87	38	65.2	4.41	Adrian.....	83	30	50.9	7.44
Thibodaux.....				5.92	Albion (1).....	76	31	49.9	5.00
West End.....				2.65	Albion (2).....	79	28	49.7	5.03
Maine.					Alma.....	77	26	49.1	6.79
Bar Harbor.....	75	30	48.0	3.12	Ann Arbor.....	74	38	49.1	5.26
Belfast.....	69	36	46.3		Arbela f.....				6.57
Calais.....	70	27	45.6	2.27	Atlantic.....	54	31	38.5	0.97
Cornish.....	73	27	46.4	6.11	Ball Mountain.....	70	27	48.1	6.75
Fairfield.....	75	20	45.2	3.45	Bangor.....	81	31	52.3	7.39
Farmington.....				3.77	Bear Lake.....	71	23	47.7	5.39
Fort Preble.....	73	28	51.0	7.55	Bellaire.....	77	24	46.0	3.77
Kennebec Arsenal.....	72	23	49.9	2.41	Bell Branch.....	76	30	49.6	5.99
Kent's Hill.....	76	26	45.2	3.99	Benton Harbor.....	79	35	54.0	7.36
Lewiston.....	77	23	45.4	5.47	Berlin.....	79	26	50.2	11.02
Mayfield.....	76	21	41.4	3.45	Berrien Springs (2).....				7.27
Orono f.....	78	24	45.5	3.36	Birch Run.....				6.63
Petit Menan.....	62	37	47.2		Birmingham.....	74	27	50.0	7.42
West Jonesport.....	66	30	47.1		Bronson.....	72	28	45.4	3.55
Maryland.					Calumet.....	68	27	43.8	2.42
Barren Creek Sp'g.....	74	31	56.0	8.32	Cassopolis.....	76	25	50.6	6.39
Cumberland (1).....	76	36	52.7	6.65	Caldwell.....	71	26	45.0	3.58
Cumberland (2).....	78	38	56.2	5.90	Charlevoix.....	70	32	48.6	5.55
Fallston.....	73	32	52.0	7.08	Cheboygan.....	68	27	45.2	2.46
Fort McHenry.....	79	34	54.6	3.22	Chelsea.....	80	25	49.7	4.05
Frederick.....	76	37	50.4	5.54	Clinton.....	82	26	49.8	4.89
Gaithersburg.....				31.1	Colon.....	76	26	47.0	3.96
McDonough.....	72	35	54.7	4.45	Concord.....	78	27	46.6	4.84
Mt. St. Mary's Col.....	75	31	54.8	7.50	Crystal Falls.....	74	24	42.8	6.68
Woodstock.....	74	28	53.8	4.43	East Saginaw.....	70	24	45.2	5.22
Massachusetts.					Eden.....	70	25	50.2	5.19
Amherst.....	72	26	48.1	6.98	Evart.....	73	23	47.1	4.12
Amherst ExSta (1).....	76	26	47.4	6.89	Fitchburg.....	77	28	48.8	5.76
Amherst ExSta (2).....	78	26	48.5	7.13	Fort Brady.....	72	28	45.6	1.53
Andover.....	76	30	48.3	8.90	Fort Mackinac.....	62	29	46.2	3.04
Blue Hill (sum't).....	73	32	47.5	7.99	Fort Wayne.....	75	26	51.1	5.82
Blue Hill (base).....	72	31	48.4	8.50	Fremont.....	74	26	48.1	4.60
Blue Hill (valley).....	75	28	47.7	8.06	Gaylord.....	61	22	41.6	1.63
Boston.....				7.92	Gladwin.....	76	24	48.1	2.89
Brewster.....	73	35	51.2	9.07	Grand Rapids.....	79	26	50.8	3.23
Cambridge (1).....	70	32	48.8	8.09	Grape.....	73	29	51.0	4.69
Cambridge (2).....	73	32	48.6	9.31	Grayling.....	74	23	44.5	3.21
Chestnut Hill.....	78	31	49.8	8.78	Gulliver Lake.....	70	24	46.8	1.58
Chicopee.....				6.99	Hanover.....	76	31	50.9	4.29
Clinton.....				9.05	Harbor Springs.....	77	26	47.4	2.63
Concord.....	75	28	47.8	8.05	Harrison.....	74	27	46.2	4.50
Cotuit.....	68	34	50.4	10.14	Harrisville.....	70	26	46.2	2.84
Deerfield.....	75	32	48.5		Hart.....	74	24	51.9	6.15
Dudley.....	79	32	48.4	5.19	Hastings.....	76	39	49.4	3.93
Fall River (1).....	72	33	49.9	10.47	Hayes.....	70	31	48.1	4.98
Fiskdale.....				7.40	Highland Station.....	72	26	48.1	4.69
Fitchburg (1).....	72	32	46.7	8.55	Hilldale.....	77	32	50.8	5.39
Fitchburg (2).....	74	27	47.1	9.26	Holt.....				3.89
Fort Warren.....	70	26	50.6	6.46	Howell.....	76	25	49.5	5.34
Framingham.....	74	28	48.5	10.26	Hudson.....	81	23	47.6	5.87
Gilbertville.....	70	24	46.2	7.94	Ionia.....	79	30	47.6	4.41
Groton (1).....	74	24	48.3	8.48	Ivan.....	70	26	49.3	5.51
Groton (2).....				8.48	Jackson.....	74	27	49.1	
Heath.....	76	26	49.4		Jeddo.....	72	29	50.1	5.99
Kendall Green.....	72	29	49.6	9.64	Kalamazoo.....	76	32	51.0	4.32
Lake Cochituate.....	78	21	46.6	10.11	Lansing.....	76	28	48.7	4.96
Lawrence.....	76	30	48.5	8.68	Lathrop.....	70	26	45.6	3.53

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>Michigan—Cont'd.</i>					<i>Missouri—Cont'd.</i>				
Madison.....	78	30	50.6	5.37	Appleton City.....	83	27	55.6	2.59
Manton.....	71	26	44.3	3.58	Austin f.....	88	32	57.4	3.50
Marshall.....	77	28	48.3	6.03	Bethany.....	86	24	50.6	3.45
May.....	75	25	50.0	5.76	Bradleyville.....	86	28	59.7	5.01
Montague.....	73	31	50.2	5.56	Brunswick.....	85	25	55.1	4.65
Mottville.....	79	29	50.8	4.25	Cape Girardeau.....	83	40	62.0	2.11
Noble.....				3.70	Carrollton.....	80	26	53.8	5.19
North Aurelius.....				5.49	Carthage.....	85	31	57.0	3.97
North Marshall.....	76	25	47.8	4.50	Cassville.....	82	23	53.8	5.13
Northport.....	67	30	47.6	2.81	Centerville.....				1.20
Olivet.....	74	25	47.4	4.58	Columbia.....	85	23	54.6	
Osage.....	80	28	49.4	5.23	Conception.....	80	22	53.4	3.23
Ovid.....	73	26	49.0	6.22	Concordia.....	86			2.50
Parkville.....				7.10	Dadeville.....	85	35	60.4	4.15
Paw Paw.....	78	30	49.5	59.4	Eldon.....	90	30	58.1	0.88
Pontiac.....	70	31	50.6	6.76	Excelsior Springs.....	81	20	52.9	5.05
Pulaski.....	74	32	47.9	4.80	Fayette.....	86	23		2.30
Ransomville.....	74	29	51.2	5.85	Fortescue.....	72	24	53.2	1.04
Romeo.....	75	26	49.2	7.93	Fox Creek.....	84	24	53.7	0.38
Roscommon.....	73	21	45.0	2.70	Glasgow.....	85	25	55.2	2.05
Saint Ignace.....	64	28	45.4	2.58	Gordonville.....	84	26	57.0	0.90
Saint John's.....	74	27	50.3	4.59	Grand Pass.....	84	28	55.8	4.13
Sand Beach.....	67	26	46.9	7.37	Hannibal.....	90	26		1.25
Standish.....	79	25	49.0	3.30	Harrisonville.....	80	25	54.6	2.37
Stanton.....	73	24	46.4	5.59	Herrmann.....	85	27	56.4	0.48
Stockbridge.....				4.59	Ironport.....	87	24	58.1	1.50
Thornville.....	75	29	50.0	7.90	Jefferson Barracks.....	89	24	57.1	0.90
Vandalia.....	75	33	50.6	6.10	Jefferson City.....	83	28	58.4	1.05
Vienna.....				2.58	Jerome.....				0.51
Washington.....	74	26	50.1	6.47	Kansas City.....	88	26	56.3	4.71
Weldon Creek.....	74	24	47.1	5.89	Kidder.....	24	50.6		4.02
West Branch.....	72	26	47.0	3.55	Kirkville.....				3.68
White Pigeon.....	74	28	47.9	4.44	Ladonia.....				0.90
Williamston.....	74	32	50.9	5.47	Lamar.....	89	27	56.8	2.94
Ypsilanti (1).....	70	26	47.1	5.53	Lamonie.....	90	34	60.1	1.01
Ypsilanti (2).....	72	28	49.4	5.44	Langdon.....	80			1.35
<i>Minnesota.</i>					Lebanon.....	80	28	58.2	2.07
Alexandria.....				2.61	Liberty.....	82	24	54.6	3.46
Crookston.....	79	28	43.2	2.93	Louisiana Bridge.....				3.07
Fairbault.....	76	17	47.2	3.12	Marshall.....	83	26	54.1	2.71
Farmington.....	66	24	45.1	2.42	Mexico.....				1.45
Fergus Falls.....				2.30	Miami (1).....	83	28	55.0	4.21
Fort Ripley.....				2.30	New Frankfurt.....	83	28	55.0	3.30
Fort Snelling.....	63	19	44.0	3.12	New Haven.....	90	26	55.6	0.40
Grand Meadow.....	68	16	43.3	2.40	Oak Ridge.....	84	30	60.3	2.00
L. Winnibegoshish.....	73	25	41.6	2.55	Oregon.....	78	27	54.4	1.86
Leech Lake.....	75	21	41.4	2.59	Pickering.....		19	49.2	2.07
Le Sueur.....	72	20	46.2	2.40	Platte River.....	80	24	54.7	3.09
Mankato.....	70	23	47.7	2.57	Princeton.....	85	24	55.2	4.90
Medford.....	72	15	44.3	2.89	Saint Charles (1).....				0.85
Minneapolis.....	70	20	44.5	2.46	Saint Charles (2).....	88	24		1.55
Montevideo.....	71	20	46.1	1.90	Saint Joseph.....				2.99
Morris.....	75	24	44.0	1.64	Saint Louis.....	88	24	55.0	0.72
Northfield.....	69	19	45.0	2.31	Sarcoxie.....	84	27	55.8	4.05
Ortonville.....				0.93	Sedalia.....	86	26	57.0	2.07
Pine River.....	75	22	40.8	2.62	Shelbina.....				3.40
Pokegama Falls.....	76	12	40.4	2.38	Steelville.....	86	20	54.2	1.23
Red Wing.....	68	21	47.2	3.81	Stella.....	86	26	57.2	1.84
Redwood Falls.....				2.25	Warrensburg.....	84	29	55.3	3.25
Rolling Green.....	70	21	44.9	2.15	Warrenton.....		26	51.3	2.89
Saint Charles.....	76	19	42.0	4.10	Willow Springs.....	84	26	57.1	2.65
Sheldon.....		21	44.2	3.24	Wither's Mills.....	86	24		3.10
Tracy.....				0.71	<i>Montana.</i>				
<i>Mississippi.</i>					Camp Poplar River.....	86	31	45.0	1.25
Aberdeen.....	84	26	58.4	2.55	Choteau.....	78	31	45.6	0.87
Agricultural College.....	83	34	63.2	3.90	Custer.....				0.70
Batesville.....	87	29	62.0	2.84	Fort Assiniboine.....	71	22	45.6	1.47
Bay Saint Louis.....	86	49	70.0	2.18	Fort Custer.....	88	24	48.9	0.98
Brookhaven.....	92	35	66.0	4.75	Fort Keogh.....	94	18	44.2	0.73
Canton.....	84	37	62.5	2.29	Fort Logan.....	67	11	41.0	0.33
Columbus (2).....	88	33	63.0	3.22	Fort Missoula.....	70	20	42.7	0.60
Corinth.....	90	30	61.1	2.34	Fort Shaw.....	79	24	49.1	2.20
Edward.....	88	36	64.6	2.93	Glendive.....	82	26	48.2	1.25
Enterprise.....	86	31	62.0	4.30	Martinsdale.....	70	20	42.3	0.17
Fayette.....	87	40	65.6	2.70	Virginia City.....	67	16	39.9	1.00
Greenville.....	85	41	63.2	2.79	<i>Nebraska.</i>				
Hattiesburg.....	91	41	68.8	4.55	Alliance.....	79	8	45.6	0.14
Hazlehurst.....	89	35	66.1	3.93	Ansel f.....	81	20	48.8	2.60
Hernando.....	84	30	59.8	1.30	Ashland.....	79	21	51.9	1.09
Holly Springs (1).....	84	34	61.0	2.70	Bassett.....	82	23		0.41
Holly Springs (2).....	86	30	60.6	2.36	Beaver City.....	88	22	52.0	0.29
Jackson.....	90	36	65.2	0.17	Creighton.....	73	20	46.6	1.24
Kosciusko.....	85	31	61.9	2.30	Crete.....				0.41
Lake.....	82	30	58.2	1.10	Culbertson.....				0.33
Logtown.....	86	40	67.0	3.46	David City.....				0.18
Louisville.....	93	31	62.8	2.69	De Soto.....	73	24	50.5	1.03
Macon (2).....	89	40	63.8	0.63	Dunning.....		28		1.07
Moss Point.....	86	37	67.4	6.31	Eriecon.....	78	25	50.3	2.18
Natches (2).....	90	40	65.6	2.23	Fairbury.....		30		1.85
Oklona.....	88	30	61.6	1.89	Fort Niobrara.....	83	12	44.6	0.60
Palo Alto.....	86	33	61.0	2.77	Fort Omaha.....	77	23	52.6	0.90
Pearlington.....	85	48	67.9	3.59	Fort Robinson.....	80	19	48.8	0.06
Port Gibson.....	89	32	63.4	2.62	Fort Sidney.....	77	25	48.2	0.73
Pontotoc.....	83	31	58.6	1.60	Franklin.....	82	23	52.4	0.70
Rienzi.....	86	31	61.1	3.09	Fremont.....	73	23	51.0	0.53
Summit.....	88			4.20	Geneva.....				2.20
Vaiden.....	95	30	62.0	1.82	Genoa.....	75	25	50.5	1.23
Washington.....	88	38	65.2	1.84	Grant.....				0.41
Water Valley.....	90	31	63.6	2.83	Hastings.....	86	26		0.75
Waynesboro (1).....	87	36	62.0	3.90	Hay Springs.....	76	17	45.2	0.43
Waynesboro (2).....	82	34	62.6	3.93	Hebron.....	82	24	53.3	2.37
West Point.....	84	38	61.8	2.92	Howe.....	75	25	55.6	1.54
Yazoo City.....				2.44	Kennedy.....	87	30	49.0	0.81
<i>Missouri.</i>					Kimball.....	80	21	48.2	0.58
Adrian.....	85	18	51.0	2.45	Lexington.....	80	17	51.9	1.01

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>Nebraska—Cont'd.</i>	0	0	0	<i>Ins.</i>	<i>New Mexico—Cont'd.</i>	0	0	0	<i>Ins.</i>
Lincoln	80	25	52.8	1.12	Bernalillo	81	17	48.4	0.50
Marquette (1)	77	30	51.3	0.45	Chama	81	17	48.4	2.77
Minden	78	30	51.3	0.30	Cuba	80	45	62.7	3.60
Nebraska City	73	24	49.7	1.49	Deming	80	45	62.7	0.47
North Loup	78	20	51.3	2.13	Embudo	81	31	55.4	0.40
Oakdale	75	22	48.4	2.39	Estalina Springs	81	31	55.4	0.32
O'Neill	85	28	51.0	0.66	Fort Bayard	81	31	55.4	0.52
Ough	72	20	44.5	0.00	Fort Marcy	73	23	48.9	0.71
Palmer	72	20	44.5	0.70	Fort Stanton	76	23	50.0	0.04
Paxton	72	20	44.5	0.04	Fort Union	75	21	48.0	0.22
Plattsmouth	72	20	44.5	2.25	Fort Wingate	75	22	49.2	0.95
Ravenna	76	22	50.4	2.04	Gallinas Spring	82	34	58.4	1.02
Sargent	78	28	54.9	1.24	Hillsborough	78	34	57.5	0.22
Seward	78	28	54.9	0.74	Lordsburg	82	34	58.1	0.26
Superior	92	28	49.2	3.28	Los Lunas	74	28	51.4	0.25
Syracuse	75	26	51.8	1.28	Nogal	77	26	53.7	0.48
Tecumseh	79	21	52.2	1.52	Red Cañon	77	26	53.7	0.79
Tekamah	73	24	53.3	1.50	<i>New York.</i>				
Wallace	78	28	49.7	0.30	Adams Centre	73	39	54.2	4.88
Weeping Water	76	20	49.8	0.62	Adelphi Academy	78	28	48.5	3.99
West Hill	73	27	48.0	1.80	Addison	78	28	48.5	6.22
West Point	76	42	59.0	2.76	Afton	78	28	48.5	5.24
Whitman	90	28	48.7	0.27	Akron	75	29	49.3	5.09
Wilcox	72	20	44.5	0.22	Alabama	74	28	45.3	4.79
York	72	20	44.5	0.41	Ardenia	73	35	51.5	5.24
<i>Nevada.</i>					Au Sable Forks	73	35	51.5	2.60
Battle Mountain	73	35	51.7	0.00	Avon	73	35	51.5	4.46
Beowawe (1)	74	20	47.5	0.00	Baldwinsville	73	35	51.5	6.30
Browns	78	36	54.1	1.05	Bethlehem Centre	75	28	47.5	5.86
Carlin	74	16	41.1	0.00	Binghamton	75	28	47.5	4.72
Carson City	79	23	47.4	0.03	Blood's Depot	77	29	51.7	5.28
Fenelon	92	30	52.7	0.00	Boyd's Corners	77	29	51.7	7.63
Golconda	82	32	51.2	0.15	Brookport	74	31	47.9	4.49
Halleck	68	10	40.3	0.00	Brookfield	73	26	44.9	6.01
Hawthorne (1)	75	38	58.1	0.50	Brookfield	73	26	44.9	6.01
Hot Springs (1)	76	28	49.5	0.01	Canton	75	28	45.6	2.28
Humboldt (1)	68	30	46.4	0.50	Central Park, N. Y.	75	37	54.5	6.56
Palisade	78	20	47.2	0.25	Cherry Creek	75	37	54.5	8.72
Palisade	80	30	48.1	0.00	Chittenango	75	37	54.5	6.28
Reno	80	30	48.1	0.00	Constableville	78	29	44.1	6.05
Tecoma	70	20	41.3	0.39	Cooperstown	70	29	45.5	5.91
Wadsworth	78	32	49.6	0.50	Davids Island	74	31	51.8	6.66
Wells	75	16	43.9	0.05	De Kalb Junction	74	31	51.8	4.80
Winemucca	73	28	50.5	0.49	Demeter	74	31	51.8	5.79
<i>New Hampshire.</i>					Deposit	74	31	51.8	7.71
Antrim	75	16	41.1	5.75	Dunkirk	82	30	52.4	9.60
Belmont	75	16	41.1	6.52	East Hampton	82	30	52.4	5.05
Berlin Falls	75	16	41.1	3.29	Easton	72	34	50.7	3.84
Berlin Mills	75	16	41.1	7.76	Elmira	72	34	50.7	5.24
Concord	75	29	47.5	7.15	Factoryville	78	26	47.3	4.45
East Canterbury	65	30	47.0	4.75	Fleming	75	31	47.3	6.55
Hanover (1)	70	23	44.8	5.14	Fort Columbus	76	36	55.4	6.00
Hanover (2)	79	22	42.6	6.16	Fort Hamilton	73	35	52.0	4.21
Lake Village	73	32	43.8	4.62	Fort Niagara	76	34	49.7	6.75
Littleton	77	30	47.4	8.10	Fort Porter	76	34	49.7	6.75
Manchester (1)	77	30	47.4	6.23	Fort Schuyler	74	36	53.3	6.75
Mine Falls	77	30	47.4	8.10	Fort Wadsworth	79	31	54.6	4.66
Nashua	78	27	47.6	7.39	Geneva	76	31	49.3	4.66
Newton	76	26	46.6	7.99	Hammondsport	72	30	50.4	6.68
North Conway	76	24	45.6	5.60	Hess Road Station	74	30	45.6	6.68
North Sutton	76	24	45.6	5.60	Honeycomb Brook	71	29	47.7	5.94
Pennichuck Station	74	21	44.4	4.93	Humphrey	79	30	47.7	5.94
Plymouth	74	21	44.4	4.93	Hyndsville	73	24	45.6	6.05
Stratford	82	21	45.5	3.19	Ithaca	73	31	49.4	4.66
Walpole	72	25	44.6	5.83	Keene Valley	81	28	45.5	5.40
West Milan	75	12	42.4	3.68	King's Station	72	28	47.9	4.12
Wier's Bridge	75	12	42.4	4.32	Liberty	61	32	44.8	4.26
Wolborough	75	12	42.4	7.20	Lyons	72	33	49.2	4.66
<i>New Jersey.</i>					Lyon Mountain	72	33	49.2	3.65
Allaire	72	31	52.9	8.12	McLean	77	26	48.0	4.51
Asbury Park	73	30	53.4	8.20	Madison Barracks	77	26	48.0	3.16
Belleville	81	28	52.9	6.50	Marshland	75	24	47.1	4.51
Beverly	77	35	57.0	7.11	Massena	75	25	44.1	2.25
Billingsport L. H.	77	35	57.0	4.58	Middletown	72	28	48.2	6.52
Bridgeton	74	27	53.5	6.01	Mount Morris	74	32	50.4	3.46
Cape May C. H.	78	38	56.0	9.96	Newark Valley	72	28	45.7	6.45
Egg Harbor City	74	27	53.5	4.97	New Lebanon Sp'gs	72	28	45.7	6.45
Freehold	74	30	52.8	7.49	New Lisbon	73	27	44.0	6.18
Gillette	75	25	51.4	9.05	Norwood	71	27	42.9	3.66
Highland Park	72	28	52.3	2.17	Number Four	71	27	42.9	3.66
Hopewell	75	32	54.4	5.35	Ogdensburg	70	29	48.0	6.21
Imlaystown	75	32	54.4	5.35	Oxford	68	28	44.1	6.21
Junction	75	32	54.4	5.35	Palermo	72	29	47.9	4.19
Lambertville	74	29	51.5	5.35	Palmyra	72	32	50.6	4.81
Locktown	75	28	54.0	5.65	Pawling	74	32	50.6	9.62
Madison	76	26	51.4	5.46	Peekskill	74	32	49.3	5.62
Moorestown	79	33	53.6	5.76	Pendleton Centre	75	30	47.0	5.04
Newark (1)	72	32	54.5	6.49	Perry City	70	27	46.3	6.02
Newark (2)	72	32	54.5	6.49	Plattsburgh B'ks	70	28	46.5	2.92
New Brunswick (1)	73	27	52.0	8.34	Port Jervis	71	25	46.7	7.25
New Brunswick (2)	72	29	53.2	8.27	Potsdam	74	29	45.3	2.33
New Brunswick (3)	72	28	52.8	8.27	Poughkeepsie	76	27	47.4	4.34
Newton	71	27	49.1	6.71	Quaker Street	71	28	44.1	7.01
Ocean City	74	41	56.7	3.40	Rome	72	30	47.2	7.26
Oceanic	76	34	55.5	10.18	Romulus	73	32	47.2	4.95
Princeton	73	33	50.0	5.17	Rondout	79	25	50.3	5.28
Rancocas	73	33	50.0	5.17	Sand Bank	72	28	45.7	4.34
Readington	72	34	54.1	6.98	Scottsville	72	28	45.7	3.75
South Orange	72	31	51.4	6.98	Setauket	72	38	52.8	10.20
Tenafly	73	24	50.7	8.49	Sherman	68	27	48.0	10.19
Trenton	78	40	57.0	7.56	Schodack Depot	68	27	48.0	6.08
Woodbury	78	34	55.7	6.51					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean			Max.	Min.	Mean	
<i>New York—Cont'd.</i>	c	o	o	<i>Ins.</i>	<i>Ohio—Cont'd.</i>	o	o	o	<i>Ins.</i>
South Canisteo	72	26	45.9	6.51	Springborough†	80	33	51.4	3.08
S. E. Reservoir	71	25	46.1	6.35	Tiffin	79	30	52.6	3.43
South Kortright*	68	32	44.0	5.47	Upper Sandusky	75	31	49.6	6.89
Turin*	71	25	46.1	5.79	Vienna*	76	30	55.0	1.60
Wappinger's Falls.	74	30	48.5	6.20	Wapakoneta	82	29	50.1	3.76
Watervleit Arsenal	76	26	45.6	5.45	Wauseon	82	29	50.1	3.05
Wedgwood.	65	30	46.9	4.30	Waverly	85	34	56.0	4.31
West Point	70	34	51.6	9.20	Waynesville	82	32	52.2	2.64
White Plains	73	33	54.0	6.50	Westerville	85	35	56.2	2.80
Willets Point	73	33	54.0	6.50	West Milton*	84	29	50.6	5.77
<i>North Carolina.</i>					Weymouth	81	30	50.0	7.45
Asheville (2).	80	30	53.0	3.77	Wooster†	79	29	53.3	2.32
Bryson City	84	32	58.9	4.55	Yellow Springs	76	32	52.4	5.62
Chapel Hill	82	22	53.6	3.70	Zanesville†	71	32	48.7	3.38
Clear Creek	88	34	63.6	2.10	<i>Oregon.</i>				
Curriek Inlet.	74	31	54.0	6.58	Albany*	73	29	51.0	1.74
Franklin	72	21	48.6	3.03	Ashland (1)	69	32	47.6	0.75
Goldsborough	79	30	55.0	4.40	Ashland (2)	76	29	51.6	0.33
Hendersonville	88	33	62.2	3.80	Bandon*	68	32	53.5	1.51
Lenoir*	86	26	56.4	6.03	Beulah	71	12	44.1	T.
Lumberton	83	31	56.1	4.96	Cascade Locks.	71	27	50.4	6.86
Marion.	82	24	55.5	4.33	Corvallis.	69	25	48.0	0.51
Morganton*	84	30	58.0	5.40	Deer Island	69	30	50.0	1.86
Mount Airy†	84	30	58.0	5.40	Dufur	74	30	50.0	2.30
Mount Holly†	82	34	61.3	3.51	Eola	72	28	49.7	2.07
Mount Pleasant	82	29	54.8	4.68	Eugene	73	37	54.2	2.74
Murphy	82	34	58.0	4.50	Forest Grove	72	41	55.1	1.66
New Bern†	82	34	58.0	4.50	Gardiner	79	20	52.3	0.46
Oak Ridge†	87	35	60.7	4.10	Gold Beach	70	28	46.1	1.23
Pittsborough†	82	35	60.7	4.10	Grant's Pass	77	26	49.5	1.20
Salisbury	82	32	55.6	6.25	Hardman	68	33	51.8	2.43
Smithfield	82	35	58.6	4.00	Heppner†	69	28	49.6	2.94
Soapstone Mount*.	80	32	63.9	7.61	Hood River	69	30	49.7	0.17
Wadesborough†	84	33	59.2	4.97	Hubbard	68	20	42.2	1.97
Washington	84	32	59.4	3.55	Jacksonville.	70	21	47.3	1.17
Weldon†	80	21	45.2	2.20	La Grande	81	23	49.0	0.12
Willeyton†	80	24	45.0	2.45	Lakeview	72	13	45.4	0.97
<i>North Dakota.</i>	82	23	43.7	3.98	Line Rock	74	28	50.5	2.32
Davenport†	78	25	44.6	4.00	McMinville.	67	31	51.2	2.42
Fort A. Lincoln.	80	21	47.8	0.60	Mount Angel.	75	11	43.0	0.23
Fort Buford	84	26	40.4	2.06	North Powder	78	23	49.6	0.63
Fort Pembina.	77	22	44.2	2.60	Pendleton	73	30	47.0	0.00
Fort Totten	78	17	43.7	1.44	Siskiyou	66	31	50.7	1.16
Fort Yates	80	20	41.2	1.25	Telocast	69	36	51.5	1.80
Gallatin*†	86	11	45.8	3.89	The Dalles	71	29	48.2	3.76
Grand Forks.	80	25	47.4	1.73	Tillamook*				
Kelso	62	30	42.4	1.84	Tillamook R'k L.H.				
Napoleon	78	32	51.4	6.33	Vernonia				
New England City.	77	33	52.0	5.49	<i>Pennsylvania.</i>				
Steele	81	30	53.0	3.84	Allegheny Arsenal.	77	33	53.6	6.32
Whapeton*†	78	29	50.3	4.20	Altoona	74	38	54.0	4.12
Wild Rice*	80	28	49.4	6.26	Aqueduct*	78	27	53.4	5.00
<i>Ohio.</i>	80	28	49.4	6.26	Bethlehem	75	27	52.9	6.17
Akron.	78	32	51.4	6.33	Blooming Grove*	78	26	49.2	8.30
Ashland*	77	33	52.0	5.49	Blue Knob*	71	26	45.9	1.73
Athens	81	30	53.0	3.84	Brookville†	71	26	45.9	6.63
Bangorville	78	29	50.3	4.20	Browsers Lock	79	31	52.3	5.72
Bellevue*	78	30	51.6	4.95	Carlisle	72	29	51.0	5.99
Bement*	80	28	49.4	6.26	Catawissa†	78	28	53.2	5.48
Caledonia†	80	31	51.8	6.58	Charlesville	65	28	50.0	5.42
Cantont.	76	30	53.4	2.37	Clarion (1)†	73	29	48.8	5.19
Circleville (1)†	80	30	53.4	2.37	Clarion (2)	77	25	51.9	6.34
Circleville (2).	83	31	52.8	3.38	Coatesville†	76	28	46.4	7.25
Clarksville	81	33	52.6	0.74	Confluence†	74	30	53.3	6.04
Cleveland	83	32	53.9	3.12	Coopersburgh	76	28	46.4	7.25
Columbus Barracks	82	30	54.4	2.42	Corry	69	28	47.6	5.50
Dayton	76	32	51.2	7.25	Drifton	74	30	53.3	6.04
Demos	82	31	51.9	5.85	Doylstown.	76	28	46.4	7.25
Ellsworth	82	30	51.0	4.20	Dryberry	74	21	45.8	7.39
Elyria	83	30	51.7	2.45	Eagle's Mere.	64	29	44.8	8.41
Findlay	75	28	47.8	7.36	Edinborough*	69	30	47.8	...
Fostoria	85	30	54.4	4.60	Emporium	75	29	51.2	5.30
Garrettsville	80	32	53.1	3.82	F'ks of Neshaminy	80	26	55.0	5.75
Georgetown.	79	29	52.1	1.45	Frankford Arsenal.	80	26	55.0	5.75
Gratiot	85	29	55.0	3.74	Frederick				
Greenville†	80	31	52.8	3.90	Freeport†				
Hanging Rock	76	30	49.5	7.74	Germantown	70	34	53.2	4.58
Hassan*	86	31	55.9	1.80	Girardville†	70	31	50.2	6.24
Hiram	70	32	49.3	8.29	Grampian Hills.	74	30	48.2	6.36
Hudson	80	28	52.3	5.34	Greensborough†				
Jacksonborough	69	30	48.5	3.47	Greenville	73	32	50.2	6.85
Jefferson	85	30	53.6	3.90	Hamburg				
Kenton*†	76	28	49.3	6.36	Hollidaysburgh.	77	27	50.7	5.02
Leipsic*	80	32	53.1	3.82	Honesdale	69	25	48.2	6.77
Logan	79	29	52.1	1.45	Huntingdon.	78	24	50.6	5.04
Lordstown	85	30	53.6	3.90	Indiana	76	28	49.9	5.31
Mansfield†	76	28	49.3	6.36	Johnstown†	76	34	52.4	5.21
Marietta (1).	80	32	52.5	4.12	Kennett Square.				
Marietta (2).	81	36	54.8	4.27	Kilmer*.	76	32	54.9	6.09
Marion.	82	33	53.4	3.74	Lancaster.	76	27	52.9	7.34
McConnellsville.	80	30	51.6	6.00	Lansdale†				
Napoleon†	74	30	51.2	4.53	Le Roy*	70	29	48.7	5.32
New Alexandria	83	29	53.2	3.45	Lewisburgh.	75	26	52.3	5.74
New Comerstown.	78	31	50.3	5.34	Ligonier	76	28	52.3	5.50
North Lewisburgh.	82	31	52.3	2.71	Lock Haven†	75	26	50.7	5.36
Oberlin	74	30	50.2	5.50	Lock No. 4†				
O. S. University†.	83	31	54.7	2.47	Mahoning†				
Orangeville*.	84	34	54.6	3.87	Mauch Chunk.	75	23	52.5	4.04
Ottawa	78	32	50.8	6.15	McConnellsburgh.	78	32	52.5	6.92
Pomeroy	81	31	54.7	2.47	Meadville (2).	71	32	48.7	4.75
Portsmouth (2)†.	84	34	54.6	3.87					
Quaker City	78	32	50.8	6.15					
Shiloh*	78	32	50.8	6.15					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
Pennsylvania—Con.					Tennessee—Cont'd.				
Myerstown.....	80	26	52.3	5.32	Brownsville.....	86	30	61.1	2.73
New Castle.....	76	28	52.7	6.36	Carthage.....	86	30	61.1	2.73
Nisbet.....	65	34	50.6	6.40	Charleston.....	86	30	61.1	2.73
Oil City.....	77	30	53.8	3.97	Clarksville.....	84	33	57.8	2.98
Ottawa.....	77	30	53.8	5.82	Clinton.....	84	33	57.8	2.98
Parker's Landing.....	84	36	52.6	7.04	Columbia.....	84	30	59.6	3.04
Petersburg.....	84	36	52.6	5.99	Covington (1).....	84	30	59.6	3.04
Philipsburgh.....	75	28	49.0	5.31	Covington (2).....	84	30	59.6	2.91
Phoenixville.....	74	29	54.1	5.12	Cumberland Gap.....	72	31	52.6	4.29
Pleasant Mount.....	74	31	45.9	6.95	Dare.....	83	30	58.9	5.80
Point Pleasant.....	75	28	54.0	5.70	Dyersburg (2).....	86	27	60.2	2.68
Pottstown.....	75	28	54.0	6.10	Fayetteville.....	82	30	58.0	3.24
Quakertown.....	76	32	50.6	7.23	Florence Station.....	85	31	57.2	3.59
Reading.....	77	30	52.7	5.31	Franklin.....	86	30	58.8	3.44
Riversburg.....	74	30	49.4	6.80	Grand Junction.....	86	28	60.4	3.68
Salem Corners.....	79	34	52.6	6.80	Greenville.....	76	30	53.5	4.23
Saltburg.....	79	34	52.6	6.80	Hohenwald.....	84	26	57.9	3.31
Seibertville.....	77	30	52.6	5.60	Jacksborough.....	77	31	55.7	4.25
Selins Grove.....	81	30	51.7	6.97	Johnsonville.....	77	31	55.7	4.25
Smith's Corners.....	75	28	49.0	5.99	Kingston (1).....	82	29	57.2	3.78
Somersel.....	75	28	49.0	7.12	Lewisburgh.....	82	29	57.2	3.78
South Easton.....	75	28	49.8	5.18	Lookout Mountain.....	83	29	55.6	3.94
State College.....	73	28	49.4	5.84	Loudon.....	83	29	55.6	3.94
Swarthmore.....	77	31	53.4	6.16	McKenzie.....	86	35	61.3	2.70
Tipton.....	79	34	51.4	5.72	Milan (2).....	89	26	59.4	2.64
Troy.....	71	32	49.2	5.37	Missionary Ridge.....	74	37	56.0	2.82
Uniontown.....	79	30	50.4	7.41	Nunnally.....	81	30	57.4	4.20
Warren.....	71	27	45.0	6.62	Parkville.....	80	32	57.5	4.20
Waynesburg.....	71	27	45.0	6.62	Riddleton.....	83	31	57.5	4.20
Wellaborough.....	75	26	46.5	4.69	Rockwood.....	78	31	54.0	3.30
West Chester.....	74	32	53.4	6.28	Rogersville.....	78	31	54.0	3.30
Westtown.....	72	29	53.6	5.75	Rugby.....	77	27	52.3	3.72
Wilkes Barre.....	79	24	48.2	4.85	Savannah.....	83	31	59.3	2.34
Wyox.....	75	22	48.1	4.24	Springdale.....	84	32	57.0	1.22
York.....	77	28	52.9	6.60	Strawberry Plains.....	82	28	56.5	2.48
Rhode Island.					Trenton.....	82	28	56.5	2.48
Bristol.....	70	34	50.9	8.30	Union City.....	87	35	60.9	2.70
Kingston (1).....	75	32	49.8	9.43	Watkins.....	88	32	60.0	3.01
Kingston (2).....	72	32	49.7	10.04	Waynesborough.....	80	28	56.3	2.48
Lonsdale.....	74	35	52.2	10.55	Texas.				
Newport.....	74	35	52.2	10.55	Austin (3).....	93	46	67.1	3.58
Olneyville.....	76	35	52.2	10.55	Belton.....	92	55	71.0	2.10
Pawtucket.....	80	39	49.4	8.86	Brady.....	92	55	71.0	2.10
Providence (2).....	80	39	49.4	8.86	Berlin.....	93	37	67.4	2.48
South Carolina.					Brasoria.....	87	40	68.4	5.64
Allendale.....	88	36	64.8	3.38	Brenham.....	91	47	70.9	3.18
Batesburg.....	84	30	63.6	4.75	Brownwood.....	90	36	66.0	1.58
Belmont.....	84	31	59.8	6.15	Camp del Rio.....	95	25	62.2	1.50
Blackville.....	86	35	61.5	4.99	Camp Eagle Pass.....	95	40	71.9	0.27
Branchville.....	86	35	61.5	4.99	C'p Peña Colorado.....	90	30	62.3	2.54
Brewer Mine.....	88	33	61.1	4.44	Coldwater.....	89	25	57.1	0.24
Camden.....	88	33	61.1	4.44	College Station.....	90	40	66.7	2.62
Charleston.....	88	33	61.1	4.44	Columbia.....	88	48	70.6	5.93
Cheraw.....	88	33	61.1	4.44	Corrienna (2).....	89	42	64.8	6.40
Cheraw (2).....	88	33	61.1	4.44	Dallas (2).....	87	45	66.8	5.92
Columbia Ex. St'n.....	88	33	61.1	4.44	Durham.....	87	45	66.8	5.92
Conway.....	87	46	66.4	4.42	Edinburgh.....	84	40	62.2	1.36
Evergreen.....	85	30	61.2	6.91	Epworth.....	84	40	62.2	1.36
Florence.....	85	44	64.2	4.13	Forestburg.....	93	35	64.2	4.93
Greenville.....	85	30	61.2	6.91	Fort Bliss.....	93	50	64.0	0.40
Greenwood.....	85	32	61.1	6.17	Fort Brown.....	91	52	75.0	4.23
Hardeeville.....	88	40	67.6	4.13	Fort Clark.....	89	41	68.8	0.92
Jacksonborough.....	88	34	64.4	2.64	Fort Davis.....	81	34	61.5	0.86
Kingstree.....	89	34	65.4	1.14	Fort Hancock.....	92	24	57.3	0.82
Kirkwood.....	89	32	57.2	3.40	Fort McIntosh.....	98	41	72.8	0.18
Kirkwood (2).....	89	32	57.2	3.40	Fort Ringgold.....	100	46	75.1	3.77
McCormick.....	86	45	67.5	3.65	Fort Worth.....	91	36	69.7	3.93
Port Royal.....	86	45	67.5	3.65	Gallinas.....	95	36	69.7	1.42
Saint George's.....	87	36	64.2	2.89	Grapevine.....	90	44	66.0	7.32
Saint Matthew's.....	86	44	66.0	1.39	Hartley.....	85	16	55.8	0.50
Simpsonville.....	89	29	59.3	5.71	Hearne.....	88	40	67.6	0.42
Spartanburg (1).....	90	22	59.0	6.53	Houston.....	91	43	69.0	7.36
Spartanburg (2).....	88	34	60.8	7.37	Huntville.....	90	41	68.3	3.62
Statesburg.....	85	38	61.7	3.35	La Grange.....	72	54	64.2	4.23
Union.....	88	36	60.1	5.25	Lampasas.....	90	40	66.1	2.59
Winnabow.....	85	30	59.0	6.34	Longview.....	90	38	66.2	6.50
South Dakota.					Luling.....	93	45	70.5	1.40
Aberdeen.....	82	12	43.4	1.33	Menardville.....	84	37	63.1	1.27
Alexandria.....	79	15	48.0	1.00	Mountain Springs.....	88	40	65.0	6.28
Brookings.....	74	28	44.2	0.31	New Braunfels.....	88	40	65.0	6.28
Canton.....	76	25	49.3	0.73	New Ulm.....	96	47	69.4	3.11
Clark.....	79	19	44.6	0.96	Orange.....	86	44	66.6	4.84
De Smet.....	77	27	42.1	0.32	Panther.....	89	44	60.1	2.83
Flandreau.....	75	12	47.1	0.65	Paris.....	88	39	64.2	4.13
Fort Bennett.....	86	16	50.2	0.43	Round Rock.....	90	42	69.2	3.80
Fort Meade.....	74	27	48.3	0.38	San Antonio.....	92	46	70.1	1.83
Fort Randall.....	80	18	53.8	0.64	Silver Falls.....	90	32	64.4	1.96
Fort Sully.....	86	20	51.2	0.51	Sugar Land.....	85	44	65.7	3.27
Howard.....	76	10	48.7	0.64	Tyler.....	87	40	65.7	5.90
Kimball.....	74	19	43.0	0.44	Venus.....	90	34	63.8	2.68
Millbank.....	85	29	48.0	1.35	Waco (2).....	90	41	67.2	3.60
Omaha.....	84	19	44.0	0.25	Weatherford.....	88	40	66.5	2.67
Omaha (2).....	81	16	46.8	0.09	Utah.				
Saint Lawrence.....	80	28	45.6	0.46	Alta.....	104	33	66.0	0.00
Scranton.....	75	28	44.6	0.72	Beaver.....	85	21	45.2	0.17
Sioux Falls.....	74	22	46.8	0.37	Bingham.....	89	28	39.6	0.00
Spearfish.....	78	29	48.5	1.37	Blue Creek.....	71	23	48.8	0.75
Vermilion.....	75	21	46.2	1.35	Corinne.....	69	28	46.9	0.60
Wolsey.....	75	13	45.7	0.51	Fort Douglas.....	70	28	49.2	1.39
Woonsocket.....	80	13	44.3	0.52	Fort DuChesne.....	69	22	45.5	1.17
Tennessee.					Grouse Creek.....	72	28	47.5	0.38
Andersonville.....	79	30	53.6	3.41	Kelton.....	72	28	47.5	0.38
Arlington.....	86	34	60.3	3.69	Levan.....	34	34	43.7	1.05
Ashwood.....	83	33	57.5	3.71	Logan.....	39	49	49.6	0.00
Austin.....	84	33	58.2	4.94	Loosee.....	72	20	46.1	0.90
Bolivar (1).....	86	35	61.0	1.90					
Bolivar (2).....	86	30	60.2	1.99					

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.)			Precip'n.	Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.			Max.	Min.	Mean.	
<i>Utah—Cont'd.</i>					<i>West Virginia—Con.</i>				
Moab.....	81	31	49.4	0.18	Elia*.....	70	34	51.6	5.96
Mount Carmel*.....	79	27	50.8	0.30	Glenville.....	70	34	51.6	5.96
Mount Pleasant.....	55	18	36.3	0.88	Harper's Ferry.....	70	34	51.6	5.35
Nephi.....	72	20	44.0	1.23	Hinton.....	70	34	51.6	4.06
Ogden (1).....	70	34	46.0	1.36	Mount Alto*.....	70	34	46.3	.....
Ogden (2)*.....	70	23d	51.6	0.00	Morgantown.....	70	34	51.6	8.20
Park City.....	70	30d	39.8d	0.00	Oceana*.....	82	30	53.2	5.50
Parowan*.....	79	26	49.3	0.59	Pleasant Hill*.....	68	31	47.3	.....
Price?.....	79	26	49.3	0.00	Point Pleasant?.....	70	34	51.6	4.20
Promontory.....	80	19	43.1	1.10	Rowlesburg (1)?.....	70	34	51.6	4.62
Provo City.....	70	30f	41.5e	0.00	Tannery*.....	75	34	52.0	.....
Richfield?.....	75	23	46.2	0.51	Weston.....	70	34	51.6	7.84
Saint George.....	80	22	60.8	0.00	Wheeling?.....	70	34	51.6	7.36
Snowville.....	65	40	53.8	0.91	White Sulph'r Sp'gs.....	70	34	51.6	3.96
Stockton.....	70	25g	40.0d	0.00	<i>Wisconsin.</i>				
Terrace.....	70	25	46.1	0.05	Butternut*.....	74	39.2	3.12	
<i>Vermont.</i>					Chippewa Falls.....	74	39.2	3.34	
Brattleborough (1).....	76	26	48.1	7.17	Embarras*.....	75	24	47.8	2.35
Brattleborough (2).....	74	28	46.9	.....	Fond du Lac.....	73	22	40.3	5.69
Burlington.....	74	31	52.3	2.02	Glasgow.....	67	33	52.0	5.23
Chelsea*.....	68	27	44.4	4.09	Grantsburg.....	70	21	44.6	1.55
Cornwall.....	70	27	48.8	2.03	Greenwood.....	75	20	45.2	3.38
East Berkshire?.....	79	20	43.9	3.50	Hayward.....	78	16	46.2	2.56
Hartland.....	78	24	46.6	5.61	Honey Creek*.....	72	26	49.2	3.90
Jacksonville.....	80	22	42.4	9.30	Ithaca.....	72	23	47.4	5.23
Lunenburg*.....	71	30	48.0	2.75	Lincoln.....	73	32	50.4	1.16
Stratford*.....	76	32	45.6	4.80	Madison.....	69	25	48.2	4.59
Vernon.....	74	30	47.6	6.66	Manitowoc.....	70	25	50.2	4.42
Weathersfield C'tre.....	70	28	45.2	.....	Koepenick.....	92	24	47.5	3.60
<i>Virginia.</i>					Medford (1)?.....	70	34	51.6	3.68
Abingdon.....	70	28	49.0	4.34	Medford (2).....	70	20	43.6	.....
Birdnest*.....	78	43	59.9	5.80	Neillville*.....	74	19	43.1	.....
Bolar*.....	74	28	48.8	5.51	Oaksholt*.....	71	26	47.1	5.89
Casanova.....	79	32	57.6	4.66	Phillips?.....	71	26	47.1	2.57
Christiansburgh?.....	79	29	54.0	3.87	Plover.....	74	20	46.0	2.02
Dale Enterprise?.....	76	13f	48.2	3.97	Portage?.....	70	34	51.6	5.35
Fall Creek Depot.....	81	30	60.2	4.09	Potosi*.....	76	45	58.2	6.17
Fort Monroe.....	82	37	60.4	3.16	Waucousta.....	70	22	44.2	.....
Fort Myer.....	75	29	54.8	4.28	Wausau.....	69	21	42.4	.....
Lexington?.....	80	30	55.0	4.90	Wauzeka.....	70	34	47.4	8.00f
Marion.....	78	26	53.0	3.99	<i>Wyoming.</i>				
Mossing Ford*.....	80	30	55.6	7.45	Camp Pilot Butte.....	73	13	42.1	0.25
Nottaway C. H.....	83	26	57.0	5.74	Camp Sheridan.....	70	16	42.1	1.68
Petersburgh?.....	81	30	56.6	8.10	Fort D. A. Russell.....	81	14	41.5	0.79
Richmond?.....	88	25	62.2	9.00	Fort Fetterman.....	85	18	42.9	T.
Salem.....	80	34	57.6	4.00	Fort McKinney.....	70	27	45.4	0.80
Staunton.....	80	28	54.8	5.51	Fort Washakie.....	73	15	42.8	2.69
Summit.....	74	22	52.8	.....	Laramie.....	67	21	38.7	0.90
Woodstock?.....	70	28	49.0	4.82	Lusk.....	73	17	44.7	0.42
Yetherville.....	78	30	54.1	3.80	Saratoga.....	69	23	38.6	1.43
Yancey's Mills.....	81	25	56.0	5.06	<i>British Columbia.</i>				
<i>Washington.</i>					New Westminster.....	62	36	48.7	10.36
Blakeley?.....	63	34	49.6	3.09	<i>Canada.</i>				
Doe Bay?.....	64	39	48.6	4.78	McGill Col. Obs'y,.....	72	31	45.8	3.69
East Sound?.....	64	38	50.0	5.65	Montreal.....	70	34	51.6	.....
Fort Canby.....	68	40	52.1	6.56	<i>Mexico.</i>				
Fort Simcoe?.....	71	40	54.4	0.00	La Logia.....	96	60	82.2	1.36
Fort Spokane.....	64	24	46.0	0.70	Leon de Aldemas.....	81	47	62.9	4.41
Fort Townsend.....	64	35	49.6	2.07	Mazatlan.....	89	74	82.0	0.26
Fort Walla Walla.....	71	32	51.0	0.84	Topolobampo*.....	90	73	82.3	1.19
Seattle.....	64	36	50.1	3.05	Zacatecas.....	81	33	56.0	4.10
Tacoma.....	69	33	51.5	3.74	<i>New Brunswick.</i>				
Vancouver B'ks.....	65	31	50.8	2.79	Saint John.....	69	29	44.2	3.19
Waterville.....	70	16	41.8	0.55	<i>New Brunswick.</i>				
<i>West Virginia.</i>					Saint John's.....	66	26	45.4	6.03
Buckhannon?.....	70	28	49.0	8.50	<i>West Indies.</i>				
Charleston?.....	70	28	49.0	3.28	Grand Turk Island.....	84	83	83.8	1.07

Table of miscellaneous meteorological data for October, 1890—Signal Service observations.

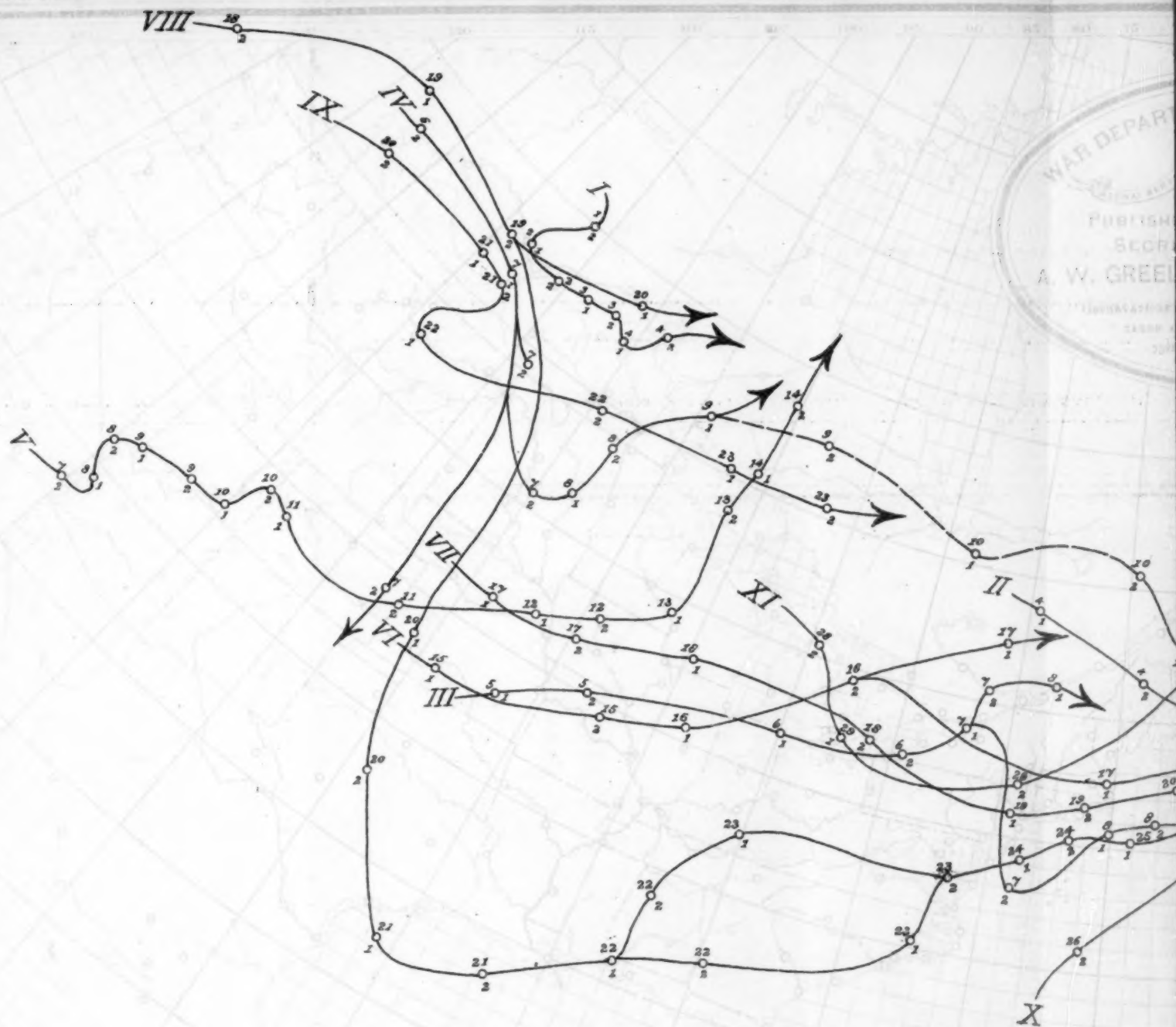
Stations and districts.	Elevation above level, feet.	Pressure, in inches.			Temperature of air, in degrees Fahrenheit.								Mean temperature of the dew-point.		Precipitation, in inches.		Departure from normal precipitation.		Wind.			Cloudless days.		Partly cloudy days.		Cloudy days.		Days with rainfall.		Average cloudiness, tenths.		Length of record, years.		Precipitation data since opening of station.		
		Mean actual.	Mean reduced.	Monthly range.	Monthly mean.	Departure from normal.	Maximum.	Mean maximum.	Minimum.	Mean minimum.	Greatest daily range.	Least daily range.	Mean temperature of the dew-point.	Mean relative humidity, per cent.	Precipitation, in inches.	Departure from normal precipitation.	Total movement, miles.	Prevailing direction.	Maximum velocity.		Cloudless days.	Partly cloudy days.	Cloudy days.	Days with rainfall.	8 a. m.	Average cloudiness, tenths.	8 p. m.	Length of record, years.	Greatest for month.	Year.	Least for month.	Year.				
																			Miles per hour.	Direction.													Date.	8 a. m.	8 p. m.	
New England.																																				
Eastport.....	53	29.78	29.84	1.35	46.6	+0.6	76	51.9	35	41.2	28	4	38.0	75.6	6.92	+2.86	8,903	ne.	44	ne.	20	8	6	17	14	5.4	4.5	17	8.41	1883	1.73	1874	7.47	1888	1.23	1874
Portland.....	99	29.77	29.88	1.12	47.7	+1.3	75	53.9	32	41.5	26	3	41.2	81.2	6.82	+3.10	6,135	n.	33	ne.	19	7	7	17	14	5.3	6.3	20	7.47	1888	1.23	1874	7.47	1888	1.23	1874
Manchester.....	247	29.04	29.90	1.04	47.8	.....	78	55.8	28	39.9	34	3	39.4	78.0	6.19	.....	3,644	nw.	24	nw.	17	10	7	14	15	5.9	5.7	4	6.19	1890	1.98	1887	6.19	1890	1.98	1887
Northfield.....	872	28.97	29.93	0.95	44.0	.....	74	52.2	21	35.8	36	4	37.0	83.2	3.49	.....	4,563	s.	36	n.	27	4	12	15	16	9.7	1.1	4	3.57	1889	1.47	1887	3.57	1889	1.47	1887
Boston.....	125	29.76	29.90	1.10	51.0	+1.0	77	56.4	36	45.6	23	4	45.4	78.6	8.72	+5.04	8,719	nw.	54	ne.	19	7	8	16	16	6.9	5.7	20	8.84	1877	0.91	1879	8.84	1877	0.91	1879
Nantucket.....	14	29.86	29.88	1.07	52.5	.....	70	56.1	41	48.9	16	1	45.8	77.0	6.72	.....	10,075	n.	54	ne.	24	7	6	18	17	2.6	7.7	4	6.72	1890	1.81	1887	6.72	1890	1.81	1887
Wood's Holl.....	22	29.86	29.88	1.07	52.5	.....	70	56.1	41	48.9	16	1	45.8	77.0	6.72	.....	10,075	n.	54	ne.	24	7	6	18	17	2.6	7.7	4	6.72	1890	1.81	1887	6.72	1890	1.81	1887
Vineyard Haven.....	27	29.86	29.89	1.09	54.1	.....	80	60.3	40	49.5	27	6	46.8	80.1	6.30	.....	11,253	nw.	60	nw.	17	7	10	14	15	.....	6.0	13	9.79	1890	0.61	1874	9.79	1890	0.61	1874
Block Island.....	27	29.86	29.89	1.09	53.4	+0.6	70	57.3	41	49.5	12	4	46.8	80.1	4.57	+0.16	13,910	nw.	78	ne.	24	7	19	14	15	.....	6.0	13	9.79	1890	0.61	1874	9.79	1890	0.61	1874
Narragansett Pier.....	22	29.86	29.89	1.09	53.4	+0.6	70	57.3	41	49.5	12	4	46.8	80.1	4.57	+0.16	13,910	nw.	78	ne.	24	7	19	14	15	.....	6.0	13	9.79	1890	0.61	1874	9.79	1890	0.61	1874
New Haven.....	107	29.78	29.90	1.03	51.3	+0.7	73	58.4	33	44.2	23	5	43.7	80.4	7.63	+3.93	4,750	ne.	40	w.	17	5	11	13	17	6.3	5.6	11	7.38	1883	2.28	1887	7.38	1883	2.28	1887
New London.....	47	29.84	29.89	1.06	52.0	+1.0	74	57.9	36	46.2	22	4	43.6	75.6	6.43	+2.08	5,403	n.	40	w.	17	5	11	15	18	6.8	5.8	18	10.09	1877	1.07	1876	10.09	1877	1.07	1876
Mid. Atlantic States.																																				
Albany.....	85	29.83	29.92	1.03	50.6	+1.4	76	57.2	34	44.1	32	4	42.9	80.2	5.70	+2.61	4,986	nw.	26	se.	7	6	6	19	17	6.8	6.7	17	7.86	1877	0.27	1882	7.86	1877	0.27	1882
New York City.....	185	29.71	29.91	1.01	55.5	+0.5	74	61.7	38	49.3	22	5	44.0	72.2	6.40	+3.16	8,911	nw.	44	nw.	17	5	11	15	15	6.4	6.3	20	7.69	1877	0.58	1879	7.69	1877	0.58	1879
Harrisburg.....	377	29.54	29.95	0.95	53.2	.....	76	59.5	34	46.9	25	3	44.6	75.8	6.40	.....	5,762	w.	36	nw.	24	8	8	15	15	5.7	6.5	3	6.40	1890	2.04	1888	6.40	1890	2.04	1888
Philadelphia.....	117	29.81	29.93	0.94	55.5	+1.5	79	61.5	36	49.5	24	5	45.5	73.9	4.82	+2.07	8,234	nw.	43	ne.	23	8	3	20	15	5.8	6.3	20	6.52	1877	0.41	1879	6.52	1877	0.41	1879
Atlantic City.....	53	29.87	29.92	0.88	55.6	+1.4	74	61.1	35	50.0	20	4	48.3	79.5	4.05	+0.81	9,561	nw.	52	nw.	17	10	7	14	15	5.4	5.7	17	8.16	1886	0.78	1876	8.16	1886	0.78	1876
Baltimore.....	70	29.85	29.94	0.89	57.0	+1.0	78	63.1	36	50.8	21	4	46.0	77.6	5.73	+2.88	3,975	nw.	28	n.	24	10	9	12	10	5.3	4.8	20	6.51	1885	0.16	1874	6.51	1885	0.16	1874
New Brunswick.....	112	29.83	29.95	0.91	52.3	+1.6	77	59.4	28	45.2	28	6	46.5	76.3	5.15	+2.07	5,464	nw.	30	nw.	20	9	6	16	14	5.9	5.1	20	8.69	1885	0.29	1874	8.69	1885	0.29	1874
Washington City.....	685	29.24	29.99	0.96	57.5	+1.5	81	65.4	38	55.3	18	5	46.1	73.2	5.18	+2.07	3,451	nw.	24	nw.	14	9	12	10	13	5.7	4.5	20	7.86	1883	0.16	1874	7.86	1883	0.16	1874
Cape Henry.....	43	29.91	29.95	0.80	61.2	+0.8	88	67.8	37	54.6	24	5	53.0	81.4	3.96	+0.25	6,991	nw.	40	nw.	27	12	11	8	11	5.5	5.4	20	9.89	1872	0.04	1874	9.89	1872	0.04	1874
S. Atlantic States.																																				
Charlotte.....	808	29.16	30.01	0.78	59.7	+1.3	86	68.7	32	50.7	28	6	48.8	74.8	4.89	+1.13	3,659	sw.	23	w.	27	19	5	7	7	3.9	2.9	13	8.04	1887	0.34	1886	8.04	1887	0.34	1886
Hatteras.....	11	29.96	29.98	0.78	65.0	+1.0	81	69.5	44	60.6	16	4	56.6	76.0	4.93	+1.92	11,888	nw.	48	nw.	27	18	5	5	10	3.8	2.9	17	12.00	1880	0.98	1886	12.00	1880	0.98	1886
Kitty Hawk.....	388	29.57	29.99	0.77	64.2	+0.2	88	71.5	40	56.9	23	5	50.0	76.0	3.71	.....	4,667	nw.	25	sw.	29	14	6	11	10	4.5	4.0	4	8.21	1887	0.02	1886	8.21	1887	0.02	1886
Raleigh.....	78	29.91	30.00	0.65	63.6	+1.1	86	71.9	38	55.9	24	6	55.3	79.5	1.88	+2.15	6,215	sw.	36	sw.	29	18	6	7	9	3.8	3.5	20	9.45	1882	0.23	1884	9.45	1882	0.23	1884
Southport.....	52	29.96	30.01	0.55	67.6	+0.4	89	74.8	41	60.3	20	7	58.7	79.5	4.64	+0.11	4,111	w.	36	e.	22	14	11	6	9	3.7	2.5	20	14.32	1876	0.01	1886	14.32	1876	0.01	1886
Wilmington.....	78	29.91	30.00	0.65	63.6	+1.1	86	71.9	38	55.9	24	6	55.3	79.5	1.88	+2.15	6,215	sw.	36	sw.	29	18	6	7	9	3.8	3.5	20	9.45	1882	0.23	1884	9.45	1882	0.23	1884
Charleston.....	52	29.96	30.01	0.55	67.6	+0.4	89	74.8	41	60.3	20	7	58.7	79.5	4.64	+0.11	4,111	w.	36	e.	22	14	11	6	9	3.7	2.5	20	14.32	1876	0.01	1886	14.32	1876	0.01	1886
Columbia.....	183	29.85	30.04	0.59	64.3	+1.7	90	74.3	36	54.3	30	5	54.4	81.4	3.90	+1.57	2,206	w.	18	sw.	29	19	5	7	9	4.4	3.2	20	6.58	1887	0.14	1886	6.58	1887	0.14	1886
Augusta.....	87	29.94	30.04	0.54	67.0	+1.0	89	75.4	41	61.5	27	7	57.6	79.5	4.12	+0.33	4,668	sw.	30	nw.	26	19	6	7	7	3.5	2.4	20	9.45	1887	0.34	1889	9.45	1887	0.34	1889
Savannah.....	87	29.94	30.04	0.54	67.0	+1.0	89	75.4	41	61.5	27	7	57.6	79.5	4.12	+0.33	4,668	sw.	30	nw.	26	19	6	7	7	3.5	2.4	20	9.45	1887	0.34	1889	9.45	1887	0.34	1889
Jacksonville.....	43	29.98	30.03	0.41	71.3	+0.7	90	79.9	43	62.7	25	9	61.2	79.2	9.07	+3.34	4,263	n.	28	w.	26	17	4	10	11	3.7	3.6	20	16.25	1880	0.10	1874	16.25	1880	0.10	1874
Florida Peninsula.																																				
Jupiter.....	28	29.99	30.02	0.24	75.6	.....	89	82.9	48	68.4	23	8	69.0	80.0	5.43	.....	4,518	s.	34	ne.	10	15	13	3	9	3.6	2.9	3	5.43	1890	3.05	1889	5.43	1890	3.05	1889
Key West.....	22	30.00	30.02	0.20	79.6	+0.6	88	83.8	64	75.4	17	2	70.4	74.0	1.86	+3.86	5,600	e.	24	n.	27	16	13	2	10	5.9	2.6	20	19.77	1883	1.13	1873	19.77	1883	1.13	1873
Mico g.....	36	30.00	30.04	0.25	73.9	.....	93	83.7	44	64.1	32	9	66.4	82.9	5.05	.....	3,292	ne.	24	nw.	26	13	13	5	11	3.3	2.9	.....	3.45	1888	0.19	1889	3.45	1888	0.19	1889
Tampa.....	44	29.99	30.03	0.25	74.2	.....	90	81.6	47	66.8	26	4	66.6	82.2	2.21	.....	6,463	nw.	35	w.	26	18	7	6	10	2.8	3.5	4	12.17	1887	2.05	1889	1			

Table of miscellaneous meteorological data for October, 1890—Signal Service observations—Continued.

[illegible]

* Two or more directions, dates, or years. † Precipitation is measured at the Boston Water Works. ‡ Received too late to be considered in departures, etc.

Chart I. Tracks of Areas of



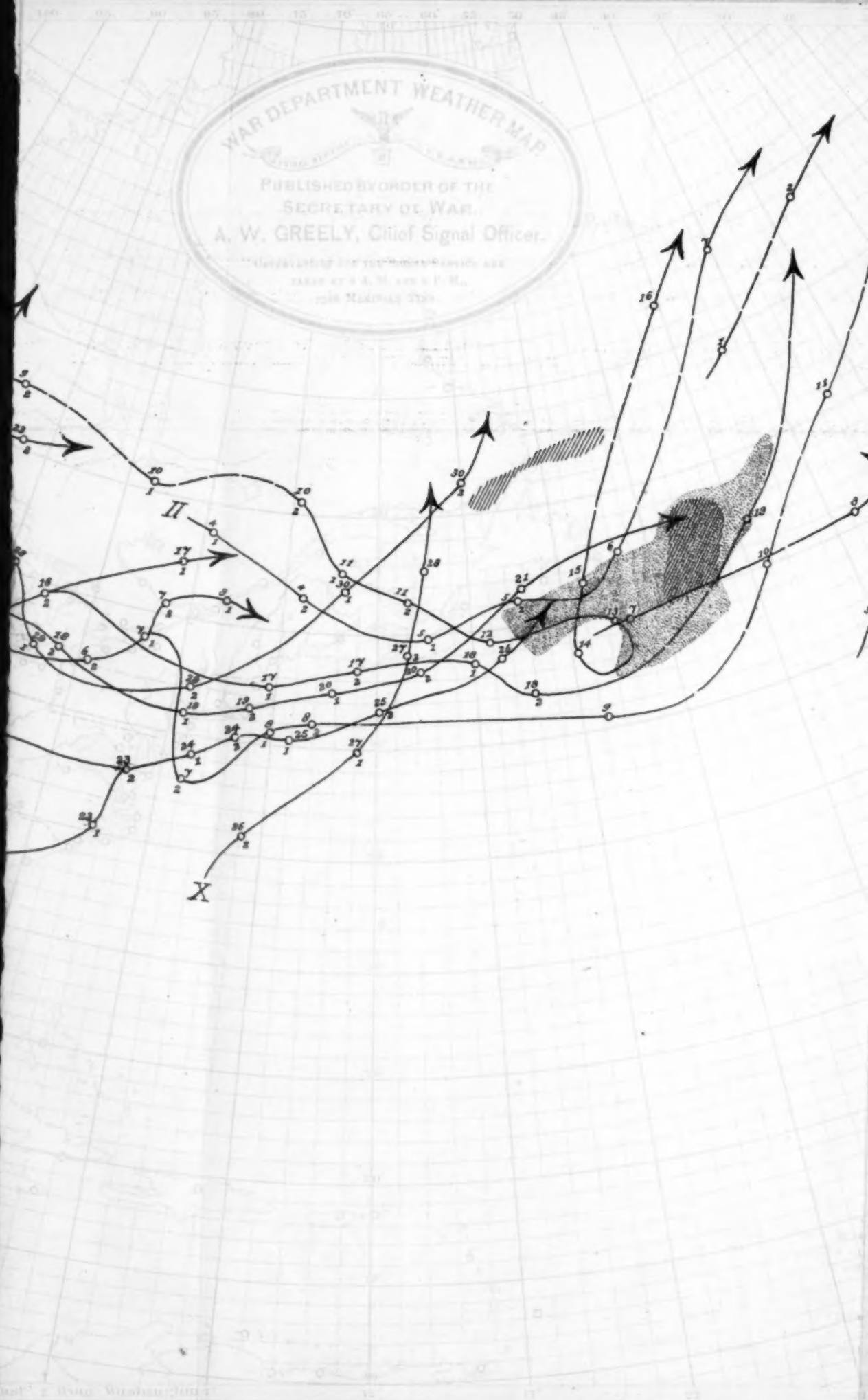
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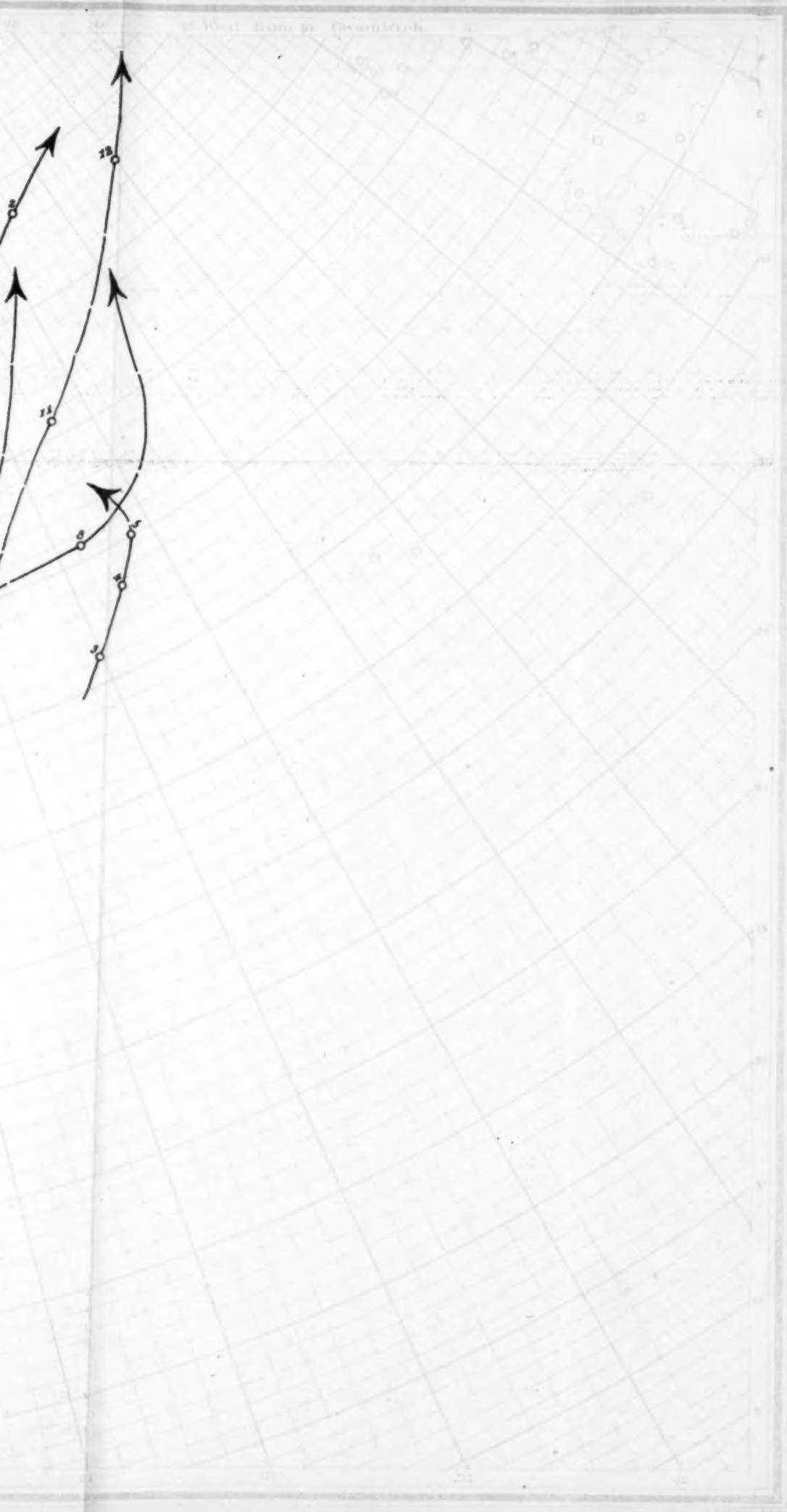
The Roman letters show number, and order of areas of low pressure. The figures above the lines show the days of the month, those below (1 and 2) indicate, respectively, the a. m. and p. m., 75th meridian time, observations.

The dotted shading () indicates fog belts.

The ruled shading () indicates the position in which field-ice or icebergs were observed.

Part I. Tracks of Areas of Low Pressure. October, 1890.





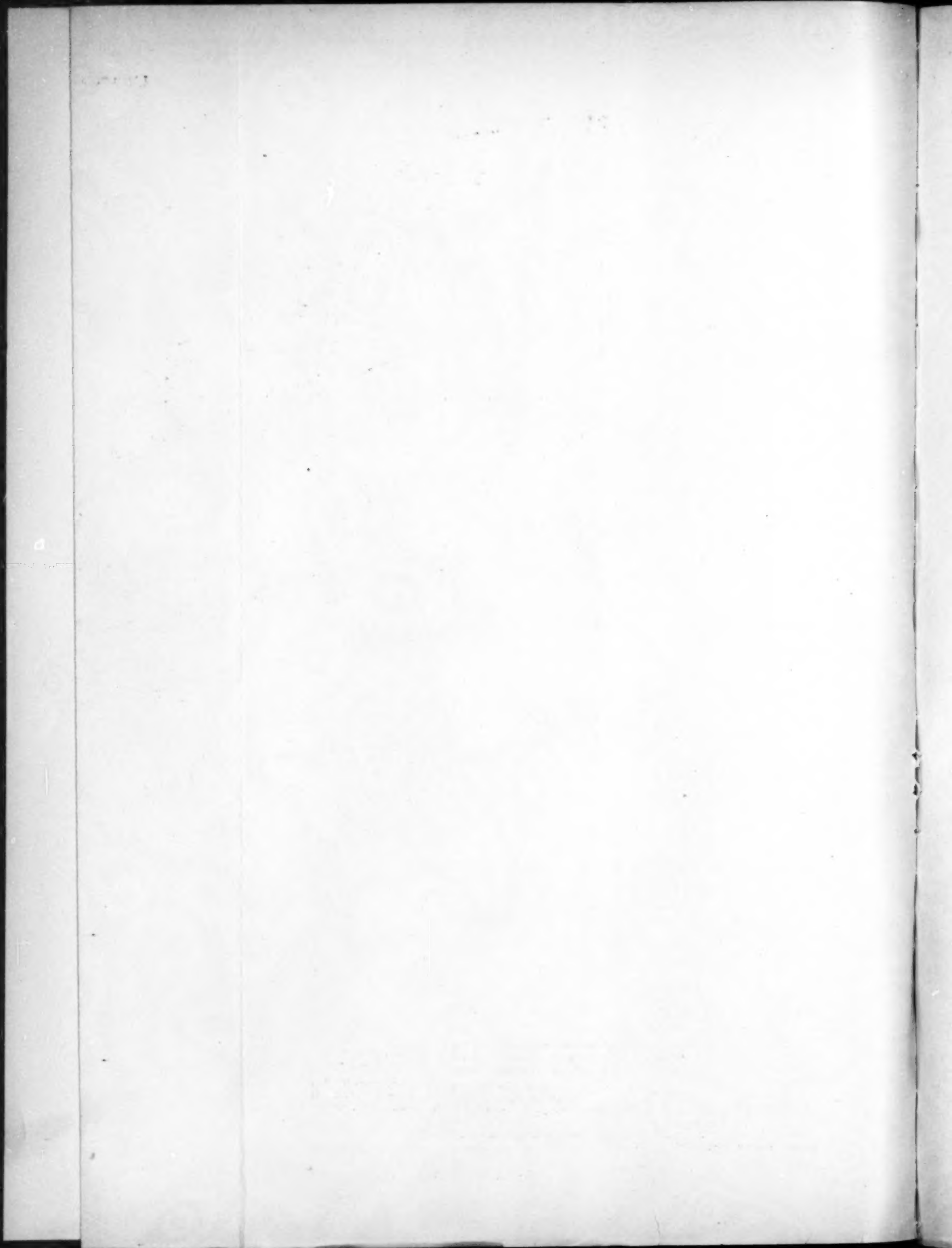


Chart II. Isobars, Isotherms, and Winds, October, 1890.



